# SIXTH ANNUAL REPORT

30 APR 1917

OF THE

# METEOROLOGICAL COMMITTEE

TO THE

# LORDS COMMISSIONERS OF HIS MAJESTY'S TREASURY.

**For the Year ended 31st March, 1911**
*(the Fifty-sixth Year of the Meteorological Office).*

**Presented to Parliament by Command of His Majesty.**

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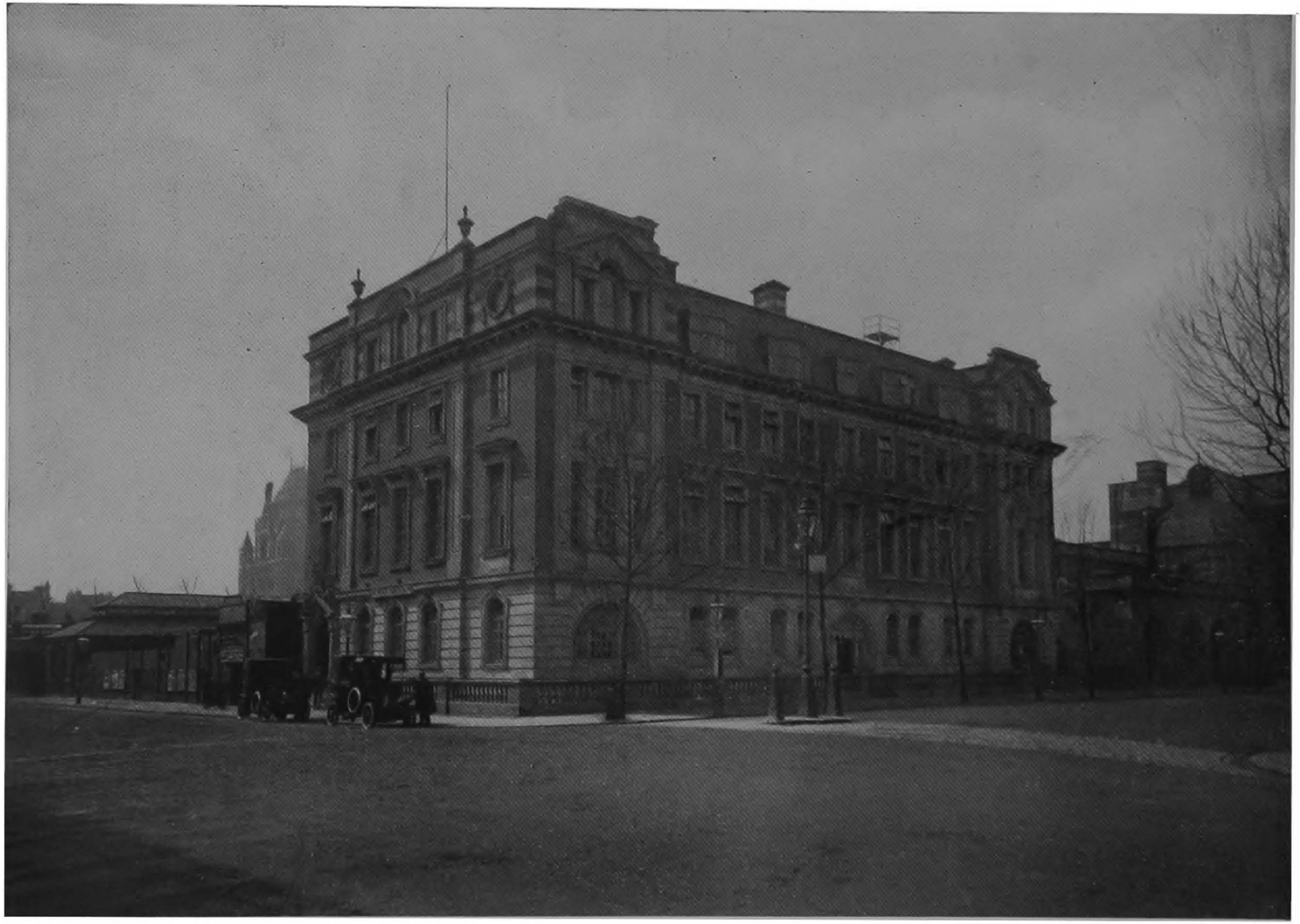
FIG. 1.



EXTERIOR VIEW OF THE METEOROLOGICAL OFFICE FROM THE NORTH-EAST.

*Frontispiece.*]

19871

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(19871—24.) Wt. 2381—7412. 1125 & 85. 8/11. D & S. G. 30. Sch. 8.

# THE METEOROLOGICAL COMMITTEE, 1910-11,

*Constituted by Minutes of the Lords Commissioners of H.M. Treasury, dated* 20*th May*, 1905, *and* 31*st March*, 1910.

| Date of Appointment. | |
|---|---|
| April 1, 1910 ... | Mr. W. N. SHAW, Sc.D., F.R.S., Director, *Chairman.* |
| " " ... | Rear-Admiral H. E. PUREY CUST, R.N.. Hydrographer to the Navy. |
| " " ... | Captain J. M. HARVEY, Principal Examiner of Masters and Mates, Board of Trade, Nominated by the Board of Trade. |
| " " ... | Professor T. H. MIDDLETON, M.A., M.Sc., Assistant Secretary of the Board of Agriculture and Fisheries. Nominated by the Board of Agriculture. |
| " " ... | Sir GEORGE H. DARWIN, K.C.B., F.R.S., University of Cambridge. Nominated by the Royal Society. |
| " " ... | Professor ARTHUR SCHUSTER, F.R.S., University of Manchester. Nominated by the Royal Society. |
| " " ... | Mr. G. L. BARSTOW. Nominated by the Treasury. |

Subject to the discretion of the authorities by which they were respectively nominated, the members of the Committee hold office for a period not exceeding five years, but are eligible for reappointment.

# THE GASSIOT COMMITTEE, 1910-11.

*Appointed in accordance with Treasury Letter of 26th February, 1910, by the Royal Society on 17th March, 1910, to administer the Trust Fund of the late J. P. Gassiot, sometime Chairman of the Kew Observatory Committee of the British Association, and to promote the scientific study of the branches of science to which the Trust relates, viz., Meteorology, Terrestrial Magnetism, Atmospheric Electricity, Seismology, and the cognate subjects.*

---

The Officers of the Royal Society :—

| | |
|---|---|
| *President* ... ... | Sir Archibald Geikie, K.C.B. |
| *Treasurer* ... ... | Mr. A. B. Kempe. |
| *Secretaries* ... ... | Sir Joseph Larmor, M.P.<br>Prof. J. Rose Bradford, |
| *Foreign Secretary* ... | Sir William Crookes, O.M. |

Dr. C. Chree.

Sir George Darwin, K.C.B.

Mr. W. H. Dines.

Dr. R. T. Glazebrook, C.B.

Captain H. G. Lyons.

Prof. J. H. Poynting.

Sir Arthur Rücker.

Prof. A. Schuster.

Dr. W. N. Shaw.

Mr. C. T. R. Wilson.

Mr. G. W. Walker.

*Secretaries :* Dr. C. Chree.
Mr. R. W. F. Harrison.

# THE STAFF OF THE METEOROLOGICAL OFFICE AND OF THE OBSERVATORIES OF THE METEOROLOGICAL COMMITTEE, 1910-11.

### Director.

William Napier Shaw, LL.D., Sc.D., F.R.S.

## METEOROLOGICAL OFFICE.

### Marine Division.

| | |
|---|---|
| *Marine Superintendent* | M. W. Campbell Hepworth,* C.B., R.D., Commander, R.N.R. |
| *Principal Assistant* | C. Harding. |
| *Nautical Assistant* | W. Allingham. |
| *Clerks* | W. G. James, C. H. Thompson; J. T. Williams; H. Keeton.†<br>Misses E. D. Anderson, D. Buckeridge, R. E. Smith. |
| *Boy Clerk* | A. Lovie.† |

### Forecast Division.

| | |
|---|---|
| *Superintendent* | R. G. K. Lempfert,* M.A. |
| *Principal Assistant* | F. J. Brodie.* |
| *Forecast Assistants* | H. Harries,* R. Sargeant. |
| *Clerks* | A. R. Simpkins, F. W. Snell; A. T. Bench, W. Hayes,† A. G. W. Howard.† |
| *Supernumerary Clerk* | W. Tomkins.† |

### Statistics and Library Division.

| | |
|---|---|
| *Superintendent* | E. Gold,* M.A. |
| *Principal Assistant* | T. Duncan Bell. |
| *Clerks* | A. J. Rigby; A. H. Bell, C. A. Bracey; C. W. Heinemann. |
| *Clerk Assistant* | C. E. P. Brooks.† |
| *Supernumerary Clerk* | A. E. Pycock. |

### Instruments Division.

| | |
|---|---|
| *Superintendent* | R. H. Curtis. |
| *Assistants* | J. Sheerman, R. F. Wallace. |
| *Clerk* | L. H. Powers. |
| *Probationer* | P. N. Skelton.† |
| *Boy Clerks* | R. Pyser,† C. G. West. |

---

* Inspectors of Meteorological Stations.

† The members of the Staff marked † form the corps of observers for the instruments installed at the office.

## LABORATORY, WORKSHOP, AND DRAWING OFFICE.

| | |
|---|---|
| *Mechanical Assistant* | J. H. James.† |
| *Photographic Assistant* | Miss E. C. Humphreys. |
| *Attendant* | B. G. Brame. |

## CORRESPONDENCE AND ACCOUNTS.

| | |
|---|---|
| *Chief Clerk and Cashier* | John A. Curtis. |
| *Clerks* | E. J. Hood ; E. L. Ardley, H. L. B. Tarrant.<br>Miss A. Turney. |
| *Boy Clerk* | N. C. Bradnock. |
| *Office Keepers* | W. H. Parsons, A. G. Goad. |
| *Senior Messenger* | C. E. Goad. |
| *Office Messenger* | W. J. Winter. |

3 Boy Messengers, 4 Cleaners.

| | |
|---|---|
| *Secretary to the Director and Clerk of Publications.* | R. Corless,* M.A. |
| *Voluntary Assistant* | H. W. Braby, B.A. |
| *Additional Inspectors* | A. Watt, M.A., Secretary Scottish Meteorological Society ; T. W. Baker, Kew Observatory ; E. G. Constable, Kew Observatory. |

*Lithographers*—Messrs. Wyman & Sons, Ltd. (A. G. King, *Artist*).

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* Inspectors of Meteorological Stations.

† The members of the Staff marked † form the corps of observers for the instruments installed at the Office.

## OBSERVATORIES.

### CENTRAL OBSERVATORY.

Kew Observatory, Old Deer Park, Richmond, Surrey.

| | |
|---|---|
| *Superintendent; Assistant-Director of Observatories.* | C. Chree, Sc.D., LL.D., F.R.S. |
| *Clerk Assistants* ... ... | E. Boxall, B. Francis. |
| *Boy Clerks* ... ... ... | G. Harris, F. Levin. |
| *Observer and Caretaker* ... | W. R. Corrin. |

### MAGNETIC OBSERVATORY.

Eskdalemuir Observatory, Langholm, Dumfries-shire, N.B.

| | |
|---|---|
| *Superintendent* ... ... | G. W. Walker, M.A., A.R.C.Sc. |
| *Clerk Assistant* ... ... | A. E. Gendle. |
| *Clerk Computer* ... ... | W. C. Parkinson |
| *Mechanic* ... ... ... | M. Black. |

1 handyman.

### WESTERN OBSERVATORY.

Valencia Observatory, Cahirciveen, co. Kerry.

| | |
|---|---|
| *Superintendent* ... ... | J. E. Cullum. |
| *Assistant* ... ... ... | M. Sugrue. |

1 handyman.

### INVESTIGATION OF THE UPPER AIR.

Pyrton Hill, Watlington, Oxon.

| | |
|---|---|
| *Director of Experiments in connexion with the Investigation of the Upper Air.* | W. H. Dines[*], F.R.S. |
| *Meteorologist in charge of Experiments for the Advisory Committee for Aeronautics.* | J. S. Dines, M.A. |
| *Assistant* ... ... ... | H. W. Baker. |

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[*] Inspector of Meteorological Stations.

# SIXTH ANNUAL REPORT

OF THE

# METEOROLOGICAL COMMITTEE

TO

# THE LORDS COMMISSIONERS OF HIS MAJESTY'S TREASURY,

## For the Year ended 31st March, 1911—the Fifty-sixth year of the Meteorological Office.

MAY IT PLEASE YOUR LORDSHIPS,

Ordinary Meetings of the Committee have been held on 4th May, 6th July, 2nd November, 7th December, 1910, and on 1st February, 1911. Special meetings in connection with the removal of the work of the office were held on 3rd August and 19th October, 1910.

The business of the year has again been exceptionally important. The work of the office has been transferred from 63, Victoria Street, where it had been housed since 1869, to the new premises in Exhibition Road, South Kensington; a number of self-recording and other instruments have been installed on the roof of the new office for the use of the staff and for the information of the public. A museum of instruments and other objects of interest in connexion with the work of the office has been equipped in the new library and its approaches; a small physical laboratory and a workshop have been provided. A lithographic press in charge of Messrs. Wyman & Sons, Ltd., has been established upon the premises by H.M. Stationery Office, for the reproduction of the Daily Weather Report, the Monthly Meteorological Charts of the Atlantic and Indian Oceans and other lithographic work of the office; the representation in the Daily Weather Report of the weather in the London district has been revised by the substitution of Kew for Westminster for observations at the international hours, 7 a.m., 1 p.m. and 6 p.m., and amplified by observations from the Royal Observatory, Greenwich, The British Rainfall Organization, Camden Square, the Scientific Society, Hampstead, and Messrs. De la Rue, Bunhill Row, in addition to observations in St. James' Park, now undertaken by the Office of Works. The transfer to the office of the administration of the Kew Physical Observatory, Richmond, and the Magnetic Observatory, Eskdalemuir, has been completed as from 1st July, 1910, in accordance with the scheme reported last year. A meeting of the International Meteorological Committee at Berlin in September, which was preceded by a meeting of the Magnetic Commission, passed resolutions in connexion with the Daily Weather Service, and the Storm Signal Service which have involved some important changes in the organization of the telegraphic work.

In accordance with your Lordships' Minute of 31st March, 1910, Captain J. M. Harvey joined the Committee as the representative of the Board of Trade in place of Sir A. J. G. Chalmers. No other change has taken place in the membership of the Committee.

**Obituary.**—The Committee regret to record the death of Sir Francis Galton, F.R.S., Copley Medallist of the Royal Society, who was connected with the administration of the office from the establishment of the Meteorological Committee of the Royal Society in 1867, to the re-constitution of the Meteorological Council in 1901. He was also closely connected with the administration of Kew Observatory. He was a member of the Committee of the British Association which had charge of the observatory until it also was transferred to the Royal Society upon the constitution of the Gassiot trust in 1871, and continued as a member of the Kew Committee of the Royal Society. He became chairman of the Committee in 1889, and remained in that position until the observatory was transferred to the National Physical Laboratory in 1900. No name is more closely associated with the details of the work of the office and of the observatory than that of Galton.

**Office Staff.**—Besides the incorporation of the staff of the observatories there have been important changes in the arrangement of the staff of the office itself. In pursuance of the programme indicated to your Lordships in the presentation of the estimates for the year a new post of superintendent of the Forecast Division has been created in order to provide for adequate attention to the steadily increasing work connected with forecasts and stormwarnings. To this post Mr. R. G. K. Lempfert, Superintendent of Statistics was appointed, and to the vacancy thereby created, Mr. Ernest Gold, Fellow of St. John's College, Cambridge, and Schuster Reader in dynamical meteorology was elected. Mr. Gold had previously been Superintendent of Instruments at the office for a year.

Very little change has otherwise taken place in the *personnel* of the office staff during the year. The actual increase of paid staff on removal has been only in respect of a boy clerk, and a boy attendant for the laboratory and workshop. A lift attendant employed by the Office of Works has also to be accounted for. It has, however, been necessary to organise a staff of observers to attend to the instruments in operation at the office, and to reorganise the duties of the office keepers and messengers in view of the changed conditions.

The tenure of appointment of Mr. C. Harding, Principal Assistant in the Marine Division of the office which would have terminated under the age limit in February, has been continued until 30th September, 1911.

Mr. T. Carlton Sutton, B.Sc., of Melbourne University, was employed at the office as student-assistant from 2nd October to 30th November, 1910, and Mr. H. W. Braby, B.A., of Sidney Sussex College, Cambridge, has been accepted as a volunteer assistant, on probation, until 30th September, 1911.

**New Premises.**—The chief event of the year has been the removal from the suite of private offices in Victoria Street, occupied since 1869, to new premises comprising the first and second floors, rooms in the basement and third floor, together with the flat roof of a new building at the corner of Exhibition Road and Imperial Institute Road, South Kensington, erected by the Office of Works to accommodate the Meteorological Office in the same building with a Post Office. The terms upon which the premises are occupied are those set out in your Lordships letter of 30th May, 1907, and they are now embodied in a lease for 21 years granted by the Office of Works to the Permanent Secretary of His Majesty's Treasury and the Director of the Office for the time being, securing the use of the premises under appropriate conditions in return for a rental of £640, with additional payments for certain additional services. At the request of the Office of Works the Committee have concurred in a proposal for the assignment of the top floor of the building as temporary offices for the Science Museum. An external view of the new building is given as the frontispiece to this report.

The chief features of the new accommodation are the provision of a library for the collection of meteorological books and data, and space in the library, ante-room, and staircase for the display of instruments, charts, diagrams, etc., forming together an appropriate museum in illustration of the work of the office and the results obtained thereby, and the accommodation on the roof for the exposure of instruments which are attended to by the staff of the office and used in connexion with the ordinary work of the office, or for the exhibition of information or records to the public. So far as possible the recording parts of the instruments are displayed in glass cases in the street-vestibule or on the staircase. Another feature of the new accommodation is the provision for delivering telegrams from the instrument room of the Post Office by pneumatic tube instead of by private wire from the Central Telegraph Office, by which the office is relieved of the necessity for maintaining a staff of telegraph operators of its own.

Showcases, instruments and special furniture for the museum, &c., have been provided out of the balance of office funds accumulated for the purpose within the last five years, which has also borne the cost of dilapidations at the termination of the tenancy in Victoria Street. The total cost will amount to about £1,000.

Ordinary furniture and fittings, including cost of removal and adaptation of existing fittings were provided by the Office of Works in accordance with Your Lordship's direction. A provisional arrangement was made for the removal of part of the work of the office on 6th October and the remainder on the 24th October but in consequence of the necessity of using all the old fittings for furnishing the new rooms in order to bring the expenditure within the limit of £800 mentioned in 1907 it was found necessary to keep the staff divided between the old and new premises until 15th November when the last members of the staff were transfered. The process of fitting the new rooms was suspended at the close of the year because the sum estimated had been spent, but it has been resumed and it is expected that the work will be completed while this report is passing through the press. In order to give the officials of various Government Departments and others an opportunity of seeing the arrangement of instruments and provision for supply of information to the public, invitations were issued by the Committee to an afternoon party on 1 December, 1910, which was attended by about 300 guests. A programme prepared for this occasion gives an account of the distribution of the various objects of interest as follows :—

## METEOROLOGICAL OFFICE.

### EXHIBITS ARRANGED FOR DECEMBER 1, 1910.

*Outer vestibule.*—**Barograph,** and the recording parts of instruments showing the **Temperature on the roof of the Office** and the **Wind Velocity** experienced at the top of the flag-pole.

*Ground Floor Hall.*—**Weekly Report.** Diagrams showing the comparison of the statistics of **temperature, rainfall** and **sunshine** of the present year, week by week, with the average for 25 years.

*Staircase.*—Photographs of **clouds.**

Diagram representing the **Temperature in the Upper Air** as obtained from registering balloons in 1907–8.

Diagrams representing the **Average Variation of Temperature, Rainfall and Sunshine,** week by week throughout the year in the 12 districts of the British Isles, compiled from the statistics of the Weekly Weather Report.

**Local Variations of Weather.** Diagram showing the differences of weather at stations in the same district in the same general type of weather.

*Hall. First floor.*—Three cases of **historical instruments,** &c. :—

A. Instruments illustrating the period of **Admiral Fitzroy,** Superintendent of the Meteorological Office under the Board of Trade, 1854–1865.

B. Instruments, &c. illustrating the period of the **Meteorological Committee of the Royal Society** with **Lieut.-General Sir. E. Sabine,** President of the Royal Society, as Chairman, and **R. H. Scott** as Director of the Office, 1867–1876.

C. Instruments, &c. illustrating the period of the **Meteorological Council** with **Professor H. J. S. Smith,** and subsequently **Sir R. Strachey,** as Chairman, 1877–1905.

Record obtained by the **Callendar electric sunshine-recorder** from a bulb exposed on the roof.

**Record of Rainfall** as collected by a funnel on the roof.

*Ante-room No.* 11.—**Relief Map of the British Isles** and neighbouring countries within a circle of 1,000 miles diameter, on the horizontal scale of 1/1,000,000, vertical scale 15/1,000,000.

**Harmonic Analyser** constructed by Mr. R. W. Munro from Lord Kelvin's designs for the Meteorological Council for the analysis of the barometric and thermometric traces obtained from the observatories.

The ordinary **Outdoor Equipment of a Meteorological Station** of the Second Order on the scheme approved by the Meteorological Office, the Royal Meteorological Society and the Scottish Meteorological Society.

Wall cases showing :

Lower Tier :—

i. **Barograms from Ships.**
ii.–iv. **Barograms** for the past week from stations in the **British Isles.**
v.–vi. Illustrations of the use of **isopleths.**
  (*a*) The average distribution of **relative humidity** throughout the day at different times of the year.
  (*b*) The average **distribution of rainfall** throughout the day at different times in the year.
vii.–viii. Selection of **Pressure-Tube Anemograms** for different parts of the British Isles and at Gibraltar, to illustrate wind structure, &c.
ix. Illustrations of **line-squalls.**

Upper Tier :—

i. ii. iii. iv. Distribution of mean January and July temperature and rainfall along **sections round the globe** at latitudes 50° N. and 50° S., at 23° N. and 23° S., and at the Equator.

v. Sunshine and fog in London in the past 36 years.

vi. Diagrams for comparing
  (*a*) the yield of **Barley** with the **accumulated temperature** of the summer and spring.
  (*b*) the yield of **Wheat** with the **rainfall** of the previous autumn.

vii. viii. ix. Maps showing the positions of recording anemometers.

*Museum and Library.—Case A.* **Normal Instruments** adopted by the Meteorological Office for use at Meteorological Stations.

The instruments are described in The Observer's Handbook of which an edition is now issued annually.

*Case B.*—Corresponding **Instruments** adopted by **other countries.**

*Case C.*—Meteorological Logs and other documents illustrating the work in **Marine Meteorology.**

Meteorological log kept on board H.M.S. "Thrush," Captain H.R.H. Prince George, now H.M. King George V.

Meteorological log by Captain Toynbee, illustrated with pen and ink sketches.

Records from the National Antarctic Expedition, 1901–04.

*Case D.*—Charts, diagrams, &c., illustrating the history of the **Daily Telegraphic Service** for forecasts and storm warnings.

Series of schedules and working charts from their commencement in 1860 to the present time, including Fitzroy's manuscript reports, the first working charts with isobars, the first reports from Iceland and the first reports by wireless telegraphy from the Navy and from Atlantic liners.

Volumes illustrating the development of the lithographed daily report.

A specimen of the cone used for storm warnings by day and a specimen of the triangle of lanterns adopted for signals at night are shown near the case of charts together with a model of the usual flagstaff and gear, and a map of the storm signal stations showing the scheme of distribution of storm warning telegrams.

Illustrations are also given of the cone and drum introduced by Fitzroy, and of the day signals by two cones proposed by the International Meteorological Committee.

*Case E.*—Charts, diagrams, &c., illustrating results obtained from the observations at **Climatological and Rainfall Stations.**

Photographs of stations.

Maps of the British Isles showing rainfall, sunshine, temperature and pressure for each of the 12 months November, 1909, to October of 1910, from the Monthly Weather Report.

Diagrams representing the sequence of wheat crops since 1885 and associated meteorological data, the relation of the death-rate from influenza to the average night temperature week by week during the prevalence of the epidemics, 1889–1908.

*Case F.*—**The upper air.**

Instruments designed and constructed by Mr. W. H. Dines, F.R.S., for the registration of temperature, &c., in the upper air.

Specimens of the kite and balloons used in the investigation of the upper air are shown over the case.

Glass models representing the distribution of temperature in the atmosphere up to a height of 15 miles over the British Isles on July 27 and 29, 1908.

Wind vanes showing the velocity and direction of wind in the upper air deduced from observations of pilot balloons at Ditcham Park, by Mr. C. J. P. Cave.

Apparatus, &c., designed and constructed for the Advisory Committee for Aeronautics.

i. Self-recording gear for theodolites to follow pilot balloons together with specimen records and results.

ii. Vector diagrams showing the changes in the direction and velocity of the wind at a height of 36 ft. above ground at Pyrton Hill drawn by an apparatus for recording changes in velocity and direction.

iii. Automatic records showing the diminution of the gustiness of the pull of a kite-wire with increasing height.

*Cases G–J.*—Four cases illustrating the use of **developable globes** to represent :

*G.*—**Charts of mean values over the globe.** Average distribution of the temperature of the sea surface, and of the air over the land in the month of February ; scale 1/20,000,000.

*H.*—**Synoptic Chart** of the distribution of pressure over the globe on 27th January, 1907, during the occurrence of exceptionally high pressure, compiled from the weather charts of all countries for that day.

*I.*—**Réseau Mondial, showing the relation of the British Empire to the Meteorology of the globe.**

Distribution of stations at the rate of two to each ten-degree square of latitude and longitude, selected to represent the meteorology of the globe, with the stations on British territory in red.

*J.*—Pressure and air temperature over the globe for January, 1905, on the smaller scale of 1/80,000,000 based on published observations taken at stations shown on (*I*).

A small globe at the top shows the distribution of pressure at high levels in the regions of elevated land.

*Case K.*—**Kew and Eskdalemuir Observatories.** Magnetic and Seismological results.

*Table L.*—**Stereo-photographs of clouds** with extended base. (Presented by J. Tennant, Esq.)

Examples of **lantern slides** prepared in the office.

**Zoetrope** showing the motion of air in travelling storms.

Traces, under the microscope, showing the relation of **pressure and temperature up to 12 miles,** obtained by registering balloons.

*Table M.*—**Rare Meteorological Books.**

Relief Model of the Winter Quarters of the Antarctic S.S. "Discovery."

*Kiosk N.*—The **meteorological records** of the past week for **Kew and Falmouth** and the Map of storm signal stations already referred to.

*Kiosk O.*—Meteorological records of the past week for **Aberdeen.**

**Sunshine records for a summer day** at the 92 stations included in the Weekly Weather Report.

**Winter Sunshine.** The records of sunshine in December, 1909—January, 1910, in London (Bunhill Row), Westminster, Kew, Cambridge, Eastbourne.

*Cabinet P.*—**Daily Weather Reports of all countries.**

*Cabinet Q.*—**Latest Climatological reports for the British Dominions.**

*Cabinet R.*—Unfolded **maps** for **developable globes** on the scale of 1/20,000,000.

*Table S.*—**Meteorological Atlases.**

*Table T.*—New Books.

*Case U.*—Kassner's Globes, showing the average distribution of the meteorological elements in January and July.

Globe showing orographical features in relief.

*Director's Room. No.* 7.—Complete set of publications of the Meteorological Office.

*Physical Laboratory and Photographic Room. No.* 27.—Experimental illustrations of the formation of **clouds** and of **halos** and **coronæ.**

*Marine Rooms. Nos.* 16, 18, *and* 20. Collection of 14,500 meteorological logs, from 1854 to the present time, with some logs of a still earlier date.

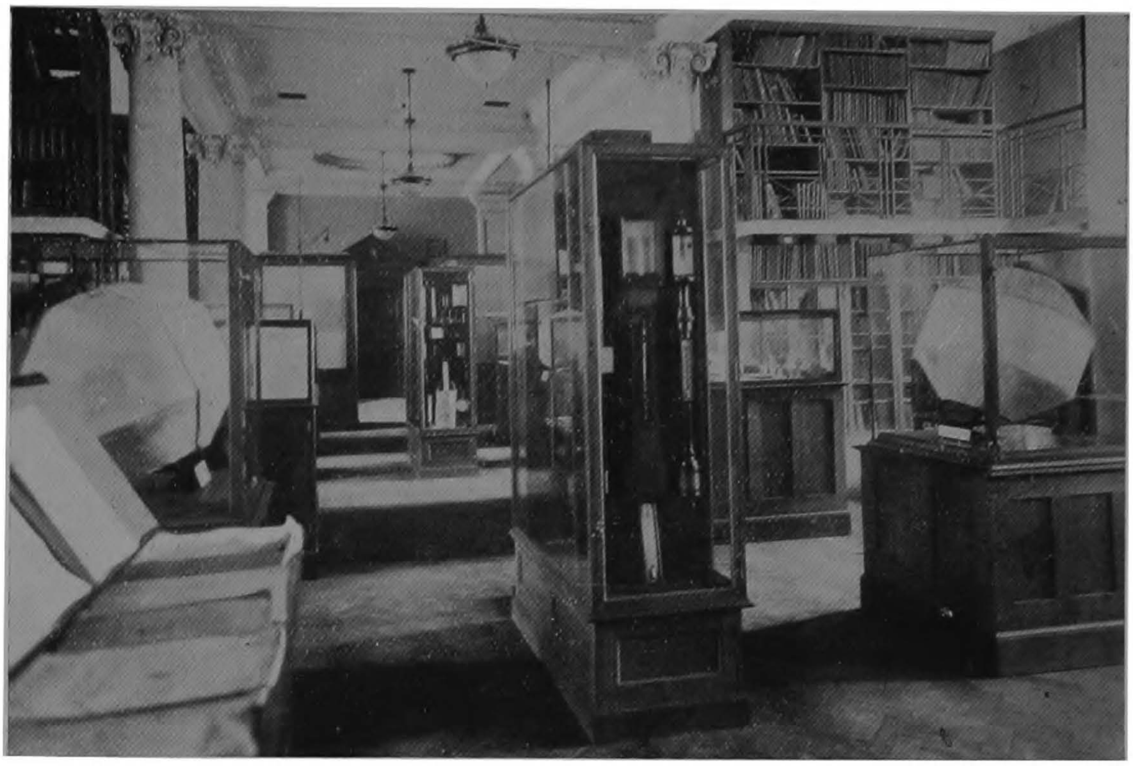
*Instrument Rooms. Nos.* 15, 17, *and* 19.—Pantagraphs and other drawing apparatus.

Stock of Instruments for the supply of the Navy, the Mercantile Marine, and Office Stations.

*Superintendent of Instruments' Room. No.* 19.—Kinematograph projection of charts illustrating the motion of air in travelling storms.

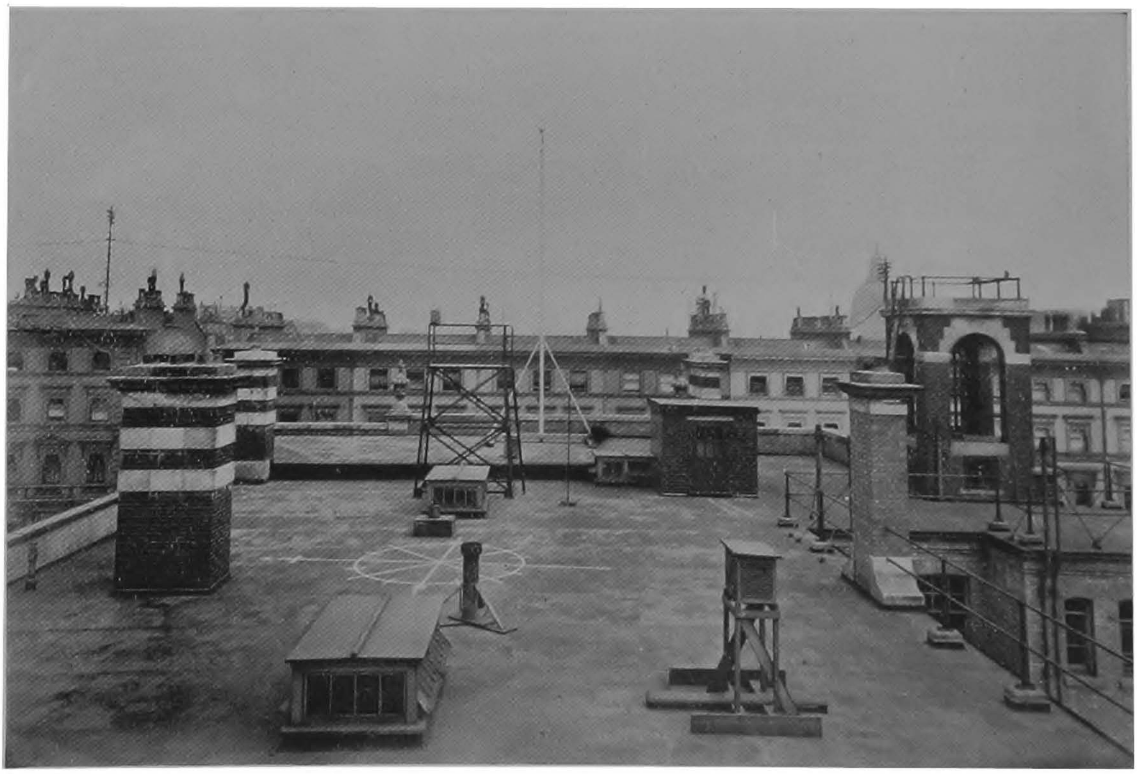
*Forecast Room. No.* 25.—Collection of working charts and reports prepared in the Office, 1860–1910.

FIG. 2.



METEOROLOGICAL OFFICE.—LIBRARY AND MUSEUM.

FIG. 3.



METEOROLOGICAL OFFICE.—ROOF.

*To face p.* 15.]

Collection of Daily Weather Reports for the areas covered by the several telegraphic systems, with daily synoptic charts of the Atlantic Ocean and of the Northern Hemisphere.

Reception of weather telegrams and preparation of the evening reports for the Press, 6 p.m. to 7 p.m.

*Statistical Room. No.* 14.—Collection of manuscript registers of observations from British stations.

*Basement Room. No* 1.—Workshop and Printing Office.

Figure 2 shows the distribution of the showcases in the library and Figure 3 the stands for instruments on the roof.

The office as now arranged affords educational facilities which are likely to prove of interest and utility to the large number of the public who are interested in the study of the weather. It has already been visited by a considerable number of persons and societies.

The new building is commodious and suitable for the work of the office. The Committee take this opportunity of expressing their thanks both to the Architects' and the Supplies Divisions of the Office of Works for the way in which they have met their requirements and for the assistance rendered in connexion with the agreement as to dilapidations with the landlords of the old premises.

The accumulation of meteorological records of all kinds made at the office during the last 55 years has proved more difficult of accommodation than had been anticipated. The boxes of exposed sunshine cards alone form a wall 50 feet long, 10 feet high and 14 inches thick, and already the storage room is found to be filled. The question as to the future policy in regard to this accumulation is one of some difficulty.

**Lithographic Press.**—One of the recognised difficulties of the removal to South Kensington is the distance of the office from the commercial and industrial parts of London. This difficulty was especially obvious with regard to the printing of the Daily Weather Report, the "transfer" of which had to be carried each morning from the office to the lithographers' premises at Denmark Hill. The copies had then to be folded, enveloped and carried to the General Post Office or to the Post Office for provincial mails at Mount Pleasant for the collection at 1.30 p.m., by messengers sent from the office for that purpose. The time spent in carrying the transfer and reports would evidently be saved by having a lithographic press on the premises and the folding and wrapping could then be carried out under proper supervision. Application was accordingly made to Your Lordships for the installation of a lithographic press in the basement and resulted in the acceptance by the Controller of H.M. Stationery Office of a tender from Messrs. Wyman & Sons, Ltd., for the erection of plant and the execution of the lithographic work of the Meteorological Office on the premises. The tender was accepted on 9th December for the work to commence on the 1st January. The necessary structural alterations were forthwith arranged and the Daily Weather Report was printed at the office and distributed directly from there on Monday, 2nd January, 1911. The first Meteorological Chart of the Atlantic printed at the office was that issued on 15th February and the first chart of the Indian Ocean that for March.

The arrangement is found to be very convenient and has made it possible for the office messengers regularly to catch the 1.30 p.m. post at Mount Pleasant. With a single machine, however, there is some liability to break-down and on two occasions within the first four months the printing of the report has had to be suspended owing to break-down in the machinery.

**Publications.**—The official publications issued or signed for press during the year by authority of the Committee are as follows :—

PERIODICAL.—The Daily Weather Report.
Monthly Meteorological Charts of the Atlantic Ocean and the Mediterranean.
Monthly Meteorological Charts of the Indian Ocean and the Red Sea.
The British Meteorological Year Book for 1910, comprising :—
  Part I.—The Weekly Weather Report with Quarterly and Annual Summaries, A Wind-force Supplement, and two Special Appendices giving supplementary results of the investigation of the upper air in the British Isles during the year.
  Part II.—The Monthly Weather Report with a summary for the year.
  Part III.—Daily Observations at Stations of the Second Order and at Anemograph Stations.
  Part IV.—Hourly Readings of pressure, temperature, humidity, rainfall, and sunshine at four normal Observatories (Aberdeen, Falmouth, Kew, and Valencia) in connexion with the Meteorological Office.
Observations at Stations of the Second Order. Annual Volume for 1907.
The Observer's Handbook. 1910 Edition.

OCCASIONAL.—Annual Volume of Observations at Stations of the Second Order for the year 1907.
The Trade Winds of the Atlantic Ocean. Contributions to the Study of the North-East and South-East Trade Winds, comprising a comparison of the changes in the temperature of the water of the North Atlantic and in the strength of the Trade Winds, by M. W. Campbell Hepworth, C.B., Commander, R.N.R., Marine Superintendent ; Climatological Tables for St. Helena, with a Report upon the Records of the Robinson anemograph from 1892 to 1907, by John Somers Dines, B.A. ; and Note on the connexion between the periodic variations of wind-velocity and of atmospheric pressure, by Ernest Gold, M.A., Schuster Reader in Meteorology.
Monthly Outline Sheets for charting tracks and noon values from Meteorological Logs.

Other publications for which authority has been given and which are in preparation, but have not yet been issued, are as follows :—

Report of the Ninth Meeting of the International Meteorological Committee, Berlin, September 26-29, 1910.
Climatological Report for certain British Stations overseas.
The Computer's Handbook.
The Seaman's Handbook.
Gales on the British Coasts. A revised edition of the Fishery Barometer Manual.
The Seasons in the British Isles.
Normals for the four Observatories, and tables for their application in climatology.
Atlas of Tropical Hurricanes.

**The Periodical Publications.**—Various important changes in the Daily Weather Report are mentioned in the section referring to the work of the Forecast Division (p. 25), and those in the Monthly Meteorological Charts in the Report of the Marine Superintendent (p. 24).

**British Meteorological and Magnetic Year Book.**—So far as the year 1910 is concerned, there has been little change from the British Meteorological Year Book of the previous year, and as regards the year 1911, no change has been made in the Weekly or Monthly Reports, which form Parts I. and II. of the publication, but the incorporation of the work of the observatories at the commencement of a new decade has made it necessary to reconstruct Parts III. and IV. which deal respectively with daily observations at first or second order stations, and with hourly readings at observatories.

In the first place the title has been changed to indicate that official magnetic data are now included. The list of stations for which daily observations are published has been revised and reduced so as to include only 16 stations instead of 20, and these have been selected with the idea that they are likely to continue for a long period unaltered in form and method. The four pages thus rendered available, and the four pages filled during the last three years with anemograph readings, have been taken to form a separate Geophysical Journal to include daily data in meteorology, atmospheric electricity, terrestrial magnetism, and seismology at the observatories under the control of the Meteorological Office.

The *Hourly Readings* have hitherto been those of the meteorological elements at the four observatories in connexion with the Meteorological Office, viz.: Valencia, Aberdeen, Falmouth, Kew, with daily maximum and minimum values and annual summaries added. These form a section of the year book of about 200 pages.

It is proposed now to give hourly readings of the meteorological elements at Valencia, Kew and Eskdalemuir, and of the terrestrial magnetic and electrical elements at Eskdalemuir, with monthly summaries of the hourly values of the meteorological elements at Aberdeen and Falmouth, and of the magnetic and electrical elements at Kew. The meteorological section to be called *Hourly Meteorological Tabulations*, will be issued month by month as the hourly readings have been heretofore, with summaries and introduction at the end of the year, while the Geophysical section called *Hourly Tabulations and Results—Geophysics*, will be issued complete with its own introduction at the end of the year. It is not anticipated that the new issues will make any serious addition to the bulk of the Year Book. For advice as to the selection of the data and the ordering of the tables of the revised publication, the Committee are indebted to the Gassiot Committee of the Royal Society.

**The Trade Winds of the Atlantic Ocean.**—In this publication the paper read by Captain Hepworth at the meeting of the British Association in Dublin in 1908, on a comparison of the force of the North-East and South-East Trade Winds of the Atlantic, and the temperatures in the North Atlantic in the subsequent year has been printed, together with a discussion of the records of the anemograph at St. Helena and a compilation of Climatological Tables for that island, by Mr. J. S. Dines, and a memorandum by Mr. E. Gold upon the mathematical relations between the diurnal variations of wind and pressure. The curious fact that the seasonal variation of wind with a maximum in September, which is a marked characteristic of the anemograph records of St. Helena, does not appear in the summary of the ship's estimates of wind on the Beaufort scale in the region of the South-East Trade, although a complementary variation is shown in the summary of the estimates of the North-East Trade leads to a discussion in the preface of the evidence for a seasonal variation of the trade winds at sea level, and a table of velocities in miles per hour is drawn up as follows :—

| — | Jan. | Feb. | Mar. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Year. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N. E. Trade | 10 | 11 | 11 | **12** | 11 | 10 | 9 | 7 | 8 | 6* | 8 | 10 | 9·4 |
| S. E. Trade | 14 | 13 | 13 | 12 | 11* | 12 | 12 | 15 | **17** | 15 | 16 | 15 | 13·8 |
| Mean ... | 12 | 12 | 12 | 12 | 11 | 11 | 10·5* | 11 | 12·5 | 10·5 | 12 | **12·5** | 11·6 |

This compensating variation of the two trade winds is compared with the seasonal variation in the position of the belt of doldrums which was investigated by Captain Hepworth in 1904, and with the climatic conditions at St. Helena, and it is shown that we may thus draw the conclusion that as the South-East Trade Wind becomes stronger it pushes the belt of doldrums to the northward against the weakening North-East Trade; it also becomes colder at St. Helena, carries less water vapour and produces less rainfall. This sequence of events takes place while the sun is north of the equator. When the sun crosses the line again on its southward journey the changes are reversed; the North-East Trade strengthens; the South-East weakens and the belt of doldrums moves back again to the equator.

Progress with the preparation of the statistical work in connexion with the seasons in the British Isles and the normals for the observatories has been interfered with by the removal and by the changes in the office staff which took place in October.

**Contributions to other Official Publications and to Scientific Journals, etc.**—In response to requests from many quarters for a fresh statement of the principles of forecasting and to the requirements of the Advisory Committees for Aeronautics with regard to the physical processes of weather for the use of aeronauts, Dr. Shaw has completed a book on *Forecasting Weather* in which the sequence of weather as represented in the daily charts is regarded from the point of view of the physical processes known to be operative in the atmosphere. The book embodies the results of the work of the office, in connexion with dynamical meteorology during the past ten years, and is illustrated mainly by charts and diagrams prepared in the office. It is in course of publication by Constable and Co., Limited.

The following papers, &c., may also be enumerated :—

By Mr. W. H. Dines—

*The vertical temperature distribution in the atmosphere over England and some remarks on the General and Local Circulation*, communicated to the Royal Society—read 11th May, 1911.

*Registering Balloon Ascents, December* 6–11, 1909, *and August* 8–13, 1910. Q. J. R. Met. Soc., vol. 37, p. 11, 1911.

By Dr. Chree, Superintendent of Kew Observatory—

*Some phenomena of magnetic disturbances at Kew.* Trans. R. Soc. A., vol. 210, pp. 271–306.

*Discussion of results obtained at Kew Observatory with an Elster and Geitel electrical dissipation apparatus from* 1907 *to* 1909. Phil. Mag. pp. 475–493, September, 1910.

(These two papers have been reprinted in the *Collected Researches* of the National Physical Laboratory, vol. vii.)

Articles on *Atmospheric Electricity*, *Aurora*, *Earth Currents* and *Magnetism Terrestrial*, to the eleventh edition of the *Encyclopaedia Britannica.*

By Mr. G. W. Walker, Superintendent of Eskdalemuir Observatory—

*The initial accelerated motion of electrified systems of finite extent, and the reaction produced by the resulting radiation.* Phil. Trans. vol. 210, p. 145, 1910.

*An electrostatic voltmeter for photographic recording of the atmospheric potential.* Proc. Roy. Soc., vol. 84A, p. 585, 1911.

*Report on experiments at Eskdalemuir with regard to Electrification of Bodies in the Air.* Report Advisory Com. for Aeronautics, 1910.

By Mr. R. Corless—

*The rate of rainfall at Kew in* 1908. Q. J. R. Met. Soc., vol. 36, p. 333, 1910.

In connexion with the work undertaken for the Advisory Committee under the direction of the office, Mr. J. S. Dines has contributed three papers to the Report of the Advisory Committee for 1910–11, viz. :—

*On a self-recording gear for theodolites for observation of pilot balloons.*

*On an anemometer head to indicate velocity and direction, together with an apparatus to record automatically vector diagrams of the wind.*

*A self-recording dynamometer and counter to register on the same chart the length of wire attached to a kite and its tension.*

The last mentioned contains interesting results as to the variation of the gustiness of wind with height.

**Branch of the Office at Farnborough.**—Negotiations have been concluded between your Lordships, the Army Council, and the Office for the establishment of a branch of the office at the Aircraft Factory, South Farnborough, in the charge of a trained meteorologist who should take charge of observational and experimental work for the office and furnish such information derived from direct observation or from the reports communicated by the office as may be required by the officers of the Air Battalion at the factory. The arrangement is that the War Office will provide accommodation for laboratory and observational work and an equipment of instruments, while the duty of providing a trained observer and directing the meteorological work rests with the office. As a temporary measure, the Advisory Committee for Aeronautics have sanctioned the application of the grant made for experimental work in continuation of that of last year to these purposes, and the Committee have appointed Mr. J. S. Dines to be Meteorologist in Charge of the Branch of the Office at Farnborough, and provisional arrangements are proceeding on the footing indicated.

**International Co-operation.**—Meetings of the ninth session of the International Meteorological Committee were held at Berlin on September 26th, 1910, and the three following days, under the chairmanship of the Director of the Office, who is President of the Committee. Out of seventeen members of the Committee twelve were present—the Directors of the meteorological services of the Argentine Republic, Austria, Canada, Denmark, France, Great Britain, Holland, Italy, Norway, Prussia, Russia, Switzerland. Resolutions were passed dealing with alterations in the European international code messages for weather telegraphy as from May 1, 1911, so as to substitute measurements of the barometric change in the three hours preceding the hour of observation for the reading of the wet bulb thermometer, and to add precision to reports about slight rainfalls. Other resolutions dealt with proposals for the adoption of an international system of storm signals contained in the report of a special commission on the subject. The scheme of day signals proposed by the Commission was approved, and the system of night signals was referred for further consideration by the Commission for Maritime Weather Signals which has been constituted as a permanent commission to take cognisance of all matters of international co-operation concerning maritime weather signals and marine meteorology.

The President was encouraged by a resolution of the Committee to continue the assistance which he had given in the previous year to the Commission for the Correlation of Solar and Terrestial Changes by compiling a list of stations to represent the meteorology of the Globe and collecting the data from the stations, for publication by the Solar Commission in conjunction with solar and magnetic data. Maps which were prepared to illustrate these proposals are now on view in the Office museum.

The meeting of the International Committee was preceded by a meeting of the International Commission for Terrestial Magnetism and Atmospheric Electricity which is referred to by Dr. Chree in his report on the work of Kew Observatory (p. 47).

The report of the proceedings of both meetings will be published as soon as the translation is completed.

The members who attended the meetings had the opportunity of visiting the series of observatories ot the Prussian Government for meteorology, astro-physics and magnetism at Potsdam and Seddin, and for scientific aeronautics at Lindenberg. The visitors were most hospitably entertained at the observatories.

**Co-operation with the British Dominions and Colonies.**—Owing to the pressure of work in other directions, little further progress has been made with the movement for eliciting the co-operation of the Dominions and Colonies in the contribution to the meteorological data required for the representation of the meteorology of the globe : and for a similar reason the publication of the data from various outlying colonies received at the Meteorological Office in manuscript has not yet been commenced. It is hoped that time will be found for these important subjects when the routine of work at the new office and the new arrangements at the observatories have been got into working order.

**Acknowledgments.** — On this occasion the Committee have specially to acknowledge the courtesy of the Spanish and Portuguese Governments in receiving representations with regard to the daily weather telegrams from the Iberian Peninsula, which, at the request of the International Meteorological Committee, were forwarded by Your Lordships through the Foreign Office to the governments mentioned. The action taken by the governments in accelerating the service of telegrams is greatly appreciated by all the meteorological services associated in the European system.

They have again to acknowledge the courtesy of the Portuguese Government, Major Chaves, and the Commercial Cable Company, in connexion with the daily telegrams from the Azores; the Eastern Telegraph Company and the Great Northern Telegraph Company, in connexion with telegrams from the Azores, the Iberian Peninsula, and the Scandinavian kingdoms.

Acknowledgments are also due to many public departments, local authorities, and private observers in all parts of the Kingdom.

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The reports of the work of the several divisions of the Office are as follows :—

## I.—MARINE DIVISION.

*Report by Campbell Hepworth, R.D., Commander, R.N.R., Superintendent.*

**Collection of Information.**—The arrangements for the systematic collection of data, for the purposes of marine meteorology, from officers of the Royal Navy and the Mercantile Marine, have been continued as in previous years. The number of vessels entered in the Office books as equipped with meteorological instruments lent by the Office, for the purpose of keeping a meteorological log, was 186 as compared with 206 last year. In addition there are 12 steamships from which reports are received by radio-telegraphy that are provided with mercury barometers lent by this Office. Meteorological four-hourly log books, registers, and other documents, to the number of 3,098 were received during the year. A list of these is given in Appendix IV. Of the meteorological log books which contain four-hourly observations, 211 have been classed as "excellent," or "very good," as compared with 210 for the year 1909–10.

**Supplementary Information.**—The arrangements for obtaining meteorological registers from the captains and officers of ocean-going ships who use their own instruments have been continued, and a large amount of information has thereby been collected, which is immediately utilised in the Monthly Meteorological Charts of the North Atlantic and Mediterranean, and of the Indian Ocean and Red Sea, when possible.

A series of barograms have been received from the flagships of H.M. Navy which give a continuous record of pressure in various parts of the world.

A recording thermograph and hygrograph were lent by special arrangement to Captain Dampier, R.N., in command of

H.M.S. "Defence," the escort ship for H.R.H. the Duke of Connaught on the voyage to the Cape of Good Hope. The records obtained on the outward and homeward passages, with a special meteorological log, have been received from Captain Dampier. The instruments have now been lent to Dr. W. J. S. Lockyer for observations on the outward and homeward passages to Vavau, Tonga Islands, whither he is travelling for the observation of the total eclipse of the sun.

The following list shows the number of contributions classified according to the different lines of route :—

*Four-hourly Logs.*

| | | |
|---|---|---|
| Greenland ... | Whaling ... ... | 3 |
| Cable Ships ... | United Kingdom | 2 |
| | North Atlantic ... | 2 |
| North Atlantic ... | Canada ... ... | 9 |
| | United States ... | 14 |
| | Gulf of Mexico ... | 33 |
| | West Indies ... | 7 |
| Mediterranean | ... ... ... | 11 |
| Black Sea ... | ... ... ... | 3 |
| Africa, S.E. and E. Coasts ... | ... | 6 |
| Ascension ... | ... ... ... | 1 |
| East Indies ... | viâ Cape ... | 16 |
| | viâ Suez ... ... | 44 |
| China and Japan | viâ Cape ... | 3 |
| | viâ Suez ... ... | 25 |
| Australia ... | viâ Cape ... | 32 |
| | viâ Suez ... ... | 36 |
| Trans-Pacific ... | ... ... ... | 8 |
| New Zealand, viâ Capes | ... ... | 28 |
| South America ... | East Coast ... | 29 |
| | West Coast ... | 8 |
| United States, West Coast ... | ... | 2 |
| Surveying ... | China Sea ... | 3 |
| | Cape ... ... | 2 |
| | Vancouver ... | 1 |

*"Short" Logs.*

| | |
|---|---|
| Mediterranean ... ... ... | 7 |
| Cape of Good Hope to Kerguelen ... | 1 |
| Trans-Pacific ... ... ... ... | 1 |

*North Atlantic Registers (Form No.* 121), *Indian Ocean Registers (Form No.* 122), *and Radio-telegraphy Registers (Form No.* 138).

| Routes. | | North Atlantic Registers. Form No. 121. | Indian Ocean Registers. Form No. 122. | Radio-telegraphy Registers. Form No. 138. |
|---|---|---|---|---|
| North Atlantic... | Canada ... ... | 481 | — | 272 |
| | United States ... | 702 | — | 388 |
| | Gulf of Mexico ... | 167 | — | — |
| | West Indies ... | 106 | — | — |
| Mediterranean ... | ... ... ... | 249 | — | 2 |
| Black Sea ... | ... ... ... | 17 | — | — |
| Africa ... ... | West Coast ... | 46 | — | — |
| | S.E. and E. Coasts | 1 | 8 | — |
| East Indies ... | viâ Cape ... ... | — | 12 | — |
| | viâ Suez ... ... | 2 | 211 | — |
| China and Japan | viâ Cape ... ... | — | 4 | — |
| | viâ Suez ... ... | — | 30 | — |
| China. Coasting | ... ... ... | — | 11 | — |
| Australia ... | viâ Cape ... ... | — | 7 | — |
| | viâ Suez ... ... | 34 | 10 | — |
| South America... | East Coast ... | — | — | — |
| North America | West Coast ... | 1 | — | — |
| | Total ... ... | 1,806 | 293 | 662 |

**Recognition of "excellent" observers.**—Appendix III. (p. 112) contains a list of the captains who, during the past year, have contributed logs classed as "excellent." Several of these observers have co-operated with the Office for many years. The names which appear in the list for the first time are as follow :—

| Captain's Name. | Steamship. |
|---|---|
| Evans, E. R. G. R., Lieut., R.N. ... | Terra Nova. |
| Grindley, G. ... ... ... ... | Crown of Arragon. |
| Kendall, H. G., Lieut., R.N.R. ... | Montrose. |
| Lord, S. ... ... ... ... | William Cliff. |
| Millington, G. A. ... ... ... | Narrung. |
| Stanley, W. ... ... ... ... | Derbyshire. |
| Taylor, L. F., Lieut., R N.R. ... | Singapore. |

As a mark of recognition of valuable co-operation, the Director has presented various publications of the Office to observers who have returned well-kept meteorological log books.

**Obituary.**—The Committee have noted with regret the deaths of twelve of their old observers during 1910–11 :—Commander G. Cawley, R.D., R.N.R., S.S. *Amcott*, and Captain H. Cook, S.S. *Peerless*, in May ; Captain A. Enright, Ship *Highflier*, in August ; Captain A. Tait, S.S. *Olympia*, in September ; Commander H. Walker, R.N.R., S.S. *Campania*, in November ;

Captain A. W. Mann, S.S. *Rewa*, and Captain A. W. Yule, S.S. *Ivydene*, in January, 1911; Captain F. Mayoss, Lieut., R.N.R., S.S. *Ruapehu*, in March, 1911; Captain A. E. Barlow, S.S. *Parramatta*, Captain A. W. Jeffery, S.S. *Teniers*, Captain B. L. Majendie, R.N., H.M.S. *Cadmus*, and Commander E. Pitts, R.N.R., S.S. *Pretorian.*

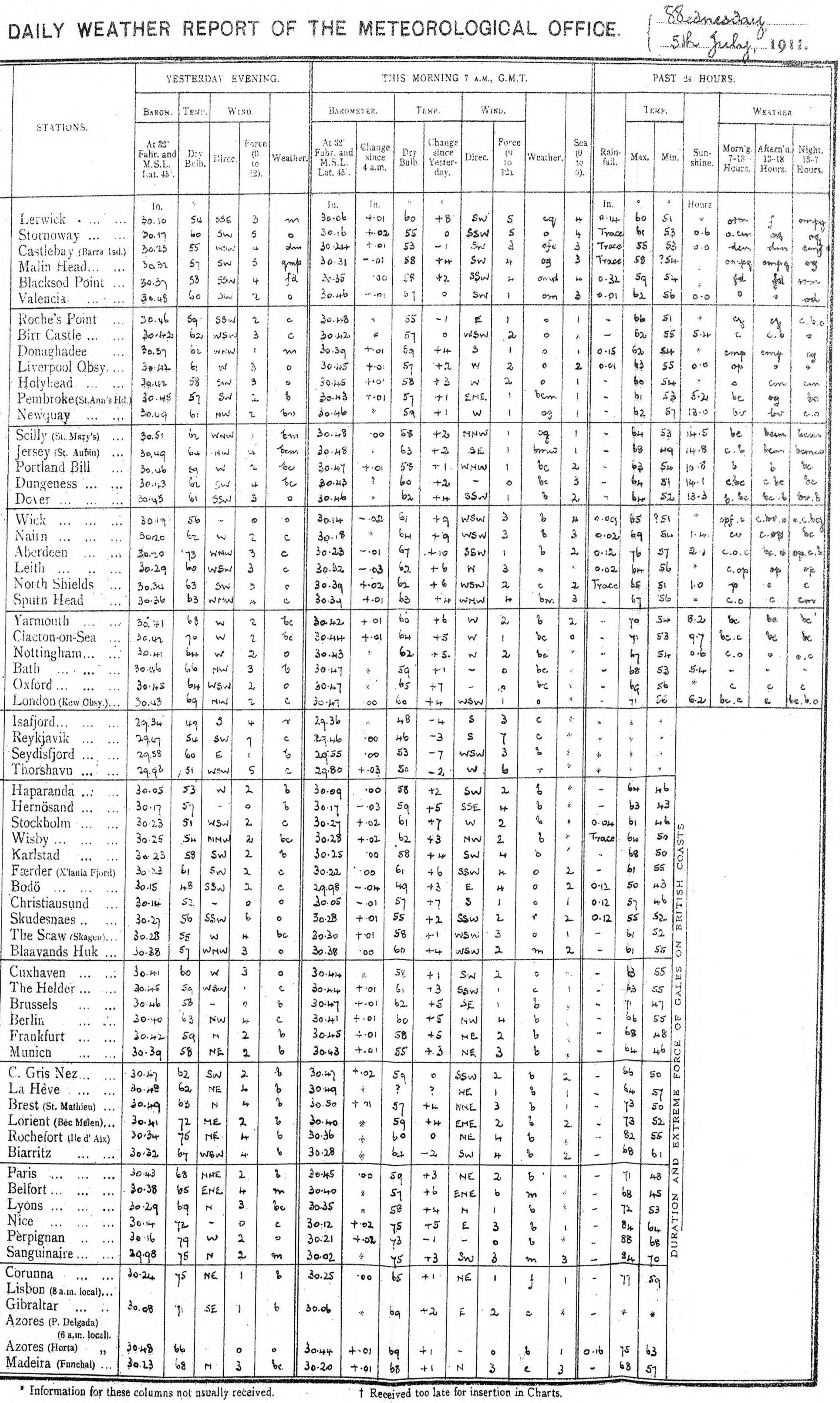
**Use of Information received.**—The information collected has been used in the preparation of the monthly meteorological charts of the North Atlantic and Mediterranean, and of the Indian Ocean and Red Sea, as in previous years. The monthly chart for the Atlantic Ocean and the Mediterranean Sea has not been altered except in detail during the year. The weekly issue with daily maps on the back showing the distribution of pressure, &c., over the Atlantic Ocean, as prepared by the incorporation of the reports by radio-telegraphy from the ocean with the information received by telegraph from either side, has been continued. The twelve monthly charts for the Indian Ocean in the enlarged form designed to take in the results of the completed discussion of data for the region between the equator and 30° S. have been issued, and for the new year commencing with the issue for May, 1910, due on 1st April, the form of the chart has been entirely revised. The scale has been reduced to make the size uniform with that of the Atlantic chart, while the area has been extended to cover the whole region from South Africa to Australia (30° E. to 125° E.), and from the Red Sea as far south as the Australian continent (30° N. to 35° S.). The distribution of the meteorological elements, pressure, and temperature of the air and sea are to be shown on the face of the chart instead of in an inset chart. In order to avoid confusion the sea temperature is indicated by tints of blue colour, the isobars by red lines, and the air isotherms by black dotted lines.

Outline charts of the globe intended for the plotting of tracks and comparing the data with mean values are now printed, and have been used for charting the observations from H.M.S. "Defence." Information as to the frequency of fog and mist in different parts of the Atlantic has been prepared, and is now appearing in successive issues of the Atlantic charts. Information was supplied to the Royal Astronomical Society forwarding observations by Marine Observers with respect to Halley's Comet; to Professor Hergesell in connexion with International Balloon ascents, data from ships over the Northern Hemisphere at 8 a.m., 27th July to 1st August, 1908; to the Admiralty, monthly mean and maxima and minima sea temperatures recorded by ships in the harbours of Aden and Bombay; to the Director-General of Observatories, Simla, meteorological observations from the log-books of ships navigating the Indian Ocean between 6° N. and 45° S. from 20° E. to 130° E. Information with respect to ice was also sent regularly to the *Shipping Gazette* and the *Journal of Commerce* during the season.

**Information supplied to the Admiralty.**—Climatological tables have been compiled for various places on the shores of Nova Scotia, the Baltic, West of England, South America, South Indian Ocean Islands, and in the Yangtse Kiang.

Fig. 4.

to face p. 24.



# DAILY WEATHER REPORT OF THE METEOROLOGICAL OFFICE.

Wednesday
5th July 1911.

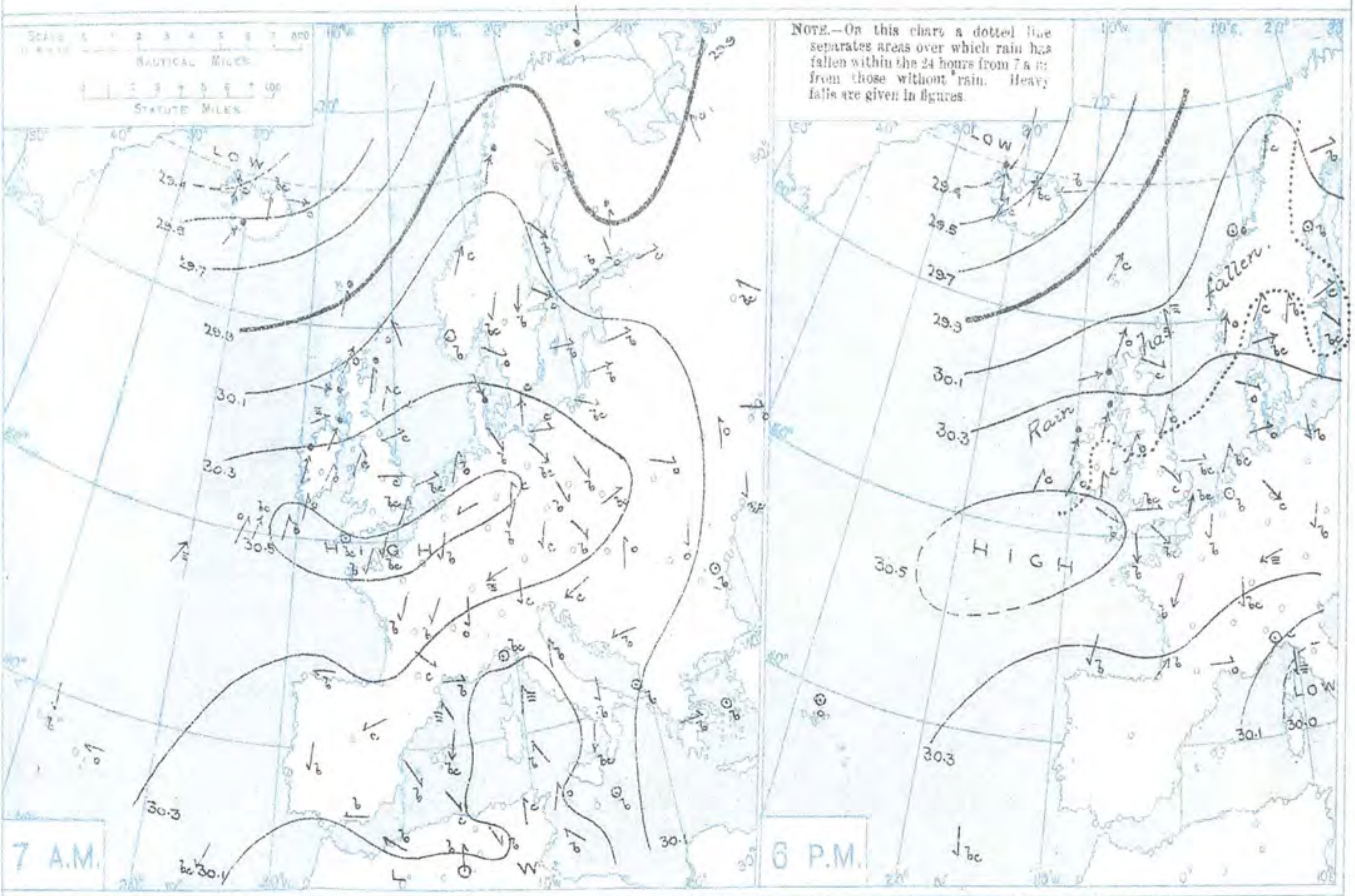
| | STATIONS. | YESTERDAY EVENING. | | | | | THIS MORNING 7 A.M., G.M.T. | | | | | | | | PAST 24 HOURS. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BAROM. | TEMP. | WIND. | | | BAROMETER. | | TEMP. | | WIND. | | | | | TEMP. | | | WEATHER. | | |
| | | At 32° Fahr. and M.S.L. Lat. 45°. | Dry Bulb. | Direc. | Force (0 to 12). | Weather. | At 32° Fahr. and M.S.L. Lat. 45°. | Change since 4 a.m. | Dry Bulb. | Change since Yesterday. | Direc. | Force (0 to 12). | Weather. | Sea (0 to 9). | Rain-fall. | Max. | Min. | Sun-shine. | Morn'g. 7–13 Hours. | Aftern'n. 13–18 Hours. | Night. 18–7 Hours. |
| | | In. | ° | | | | In. | In. | ° | ° | | | | | In. | ° | ° | Hours | | | |
| BRITISH ISLANDS. | Lerwick ... ... | 30.10 | 54 | SSE | 3 | m | 30.06 | +.01 | 60 | +8 | SW | 5 | cq | 4 | 0.14 | 60 | 51 | * | otr | f | ompq |
| | Stornoway ... ... | 30.17 | 60 | SW | 5 | o | 30.16 | +.02 | 55 | 0 | SSW | 5 | o | 4 | Trace | 61 | 53 | 0.6 | o.cm | og | mg |
| | Castlebay (Barra Isd.) | 30.25 | 55 | WSW | 4 | dm | 30.24 | +.01 | 53 | −1 | SW | 3 | ofe | 3 | Trace | 55 | 53 | 0.0 | dem | dm | cmg |
| | Malin Head... ... | 30.32 | 57 | SW | 5 | qmp | 30.31 | −.01 | 58 | +4 | SW | 4 | og | 3 | Trace | 58 | ?54 | | om.pq | ompq | og |
| | Blacksod Point ... | 30.37 | 58 | SSW | 4 | fd | 30.35 | .00 | 58 | +2 | SSW | 4 | omd | 4 | 0.32 | 59 | 54 | * | fd | fd | [illegible] |
| | Valencia ... ... | 30.48 | 60 | SW | 2 | o | 30.46 | −.01 | 57 | 0 | SW | 1 | om | 3 | 0.01 | 62 | 56 | 0.0 | o | o | od |
| | Roche's Point ... | 30.46 | 59 | SSW | 2 | c | 30.48 | * | 55 | −1 | E | 1 | o | 1 | – | 66 | 51 | * | cg | cg | c.b.o |
| | Birr Castle ... ... | 30.42 | 62 | WSW | 3 | c | 30.42 | * | 57 | 0 | WSW | 2 | o | * | – | 62 | 55 | 5.4 | c | c.b | * |
| | Donaghadee ... | 30.37 | 62 | WNW | 1 | m | 30.39 | +.01 | 59 | +4 | S | 1 | o | 1 | 0.15 | 62 | 54 | * | cmp | cmg | og |
| | Liverpool Obsy. ... | 30.42 | 61 | W | 3 | o | 30.45 | +.01 | 57 | +2 | W | 2 | o | 2 | 0.01 | 63 | 55 | 0.0 | op | o | o |
| | Holyhead ... ... | 30.42 | 58 | SW | 3 | o | 30.45 | +.01 | 58 | +3 | W | 2 | o | 1 | – | 60 | 54 | * | o | cm | cm |
| | Pembroke (St. Ann's Hd.) | 30.45 | 57 | SW | 2 | b | 30.43 | +.01 | 57 | +1 | ENE. | 1 | bcm | 1 | – | 61 | 53 | 5.2 | bc | og | bc |
| | Newquay ... ... | 30.49 | 61 | NW | 2 | bm | 30.46 | * | 59 | +1 | W | 1 | og | 1 | – | 62 | 57 | 13.0 | bc | bc | c.o |
| | Scilly (St. Mary's) ... | 30.51 | 62 | WNW | 1 | bm | 30.48 | .00 | 58 | +2 | NNW | 1 | og | 1 | – | 64 | 53 | 14.5 | bc | bcm | bcm |
| | Jersey (St. Aubin) ... | 30.49 | 64 | NW | 4 | bcm | 30.48 | * | 63 | +2 | SE | 1 | bmo | 1 | – | 68 | 49 | 14.8 | c.b | bcm | bcmo |
| | Portland Bill ... | 30.46 | 59 | W | 2 | bc | 30.47 | +.01 | 58 | +1 | WNW | 1 | bc | 2 | – | 63 | 54 | 10.8 | b | b | bc |
| | Dungeness ... ... | 30.43 | 62 | SW | 4 | bc | 30.43 | ? | 60 | +2 | – | 0 | bc | 3 | – | 64 | 51 | 14.1 | c.bc | c.bc | bc |
| | Dover ... ... ... | 30.45 | 61 | SSW | 3 | o | 30.46 | * | 62 | +4 | SSW | 1 | b | 2 | – | 64 | 52 | 13.3 | b.bc | bc.b | bc.b |
| | Wick ... ... ... | 30.19 | 56 | – | 0 | o | 30.14 | −.02 | 61 | +9 | WSW | 3 | b | 4 | 0.09 | 65 | ?51 | * | opf.o | c.bc.o | o.c.bc |
| | Nairn ... ... ... | 30.20 | 62 | W | 2 | c | 30.18 | * | 64 | +9 | WSW | 3 | b | 3 | 0.02 | 69 | 54 | 1.4 | cu | c.op | bc |
| | Aberdeen ... ... | 30.20 | 73 | WNW | 3 | c | 30.23 | −.01 | 67 | +10 | SSW | 1 | b | 2 | 0.12 | 76 | 57 | 2.1 | c.o.c | bc.o | op.c.b |
| | Leith ... .. ... | 30.29 | 60 | WSW | 3 | c | 30.32 | −.03 | 62 | +6 | W | 3 | o | * | 0.02 | 64 | 56 | * | c.op | op | op |
| | North Shields ... | 30.34 | 63 | SW | 3 | c | 30.39 | +.02 | 62 | +6 | WSW | 2 | c | 2 | Trace | 65 | 51 | 1.0 | p | o | c |
| | Spurn Head ... | 30.36 | 63 | WNW | 4 | c | 30.34 | +.01 | 63 | +4 | WNW | 4 | bm | 3 | – | 67 | 56 | * | c.o | c | cm |
| | Yarmouth ... ... | 30.41 | 68 | W | 2 | bc | 30.42 | +.01 | 60 | +6 | W | 2 | b | 2 | – | 70 | 54 | 8.2 | bc | bc | bc |
| | Clacton-on-Sea ... | 30.42 | 70 | W | 2 | bc | 30.44 | +.01 | 64 | +5 | W | 1 | bc | 0 | – | 71 | 53 | 9.7 | bc.c | bc | bc |
| | Nottingham... ... | 30.41 | 64 | W | 2 | o | 30.43 | * | 62 | +5 | W | 2 | bc | * | – | 67 | 54 | 0.6 | c.o | o | o.c |
| | Bath ... ... ... | 30.46 | 66 | NW | 3 | b | 30.47 | * | 59 | +1 | – | 0 | bc | * | – | 68 | 53 | 5.4 | – | – | – |
| | Oxford ... ... ... | 30.45 | 64 | WSW | 2 | o | 30.47 | * | 65 | +7 | – | 0 | bc | * | – | 69 | 56 | * | c | c | c |
| | London (Kew Obsy.)... | 30.43 | 69 | NW | 2 | c | 30.47 | .00 | 60 | +4 | WSW | 1 | o | * | – | 71 | 56 | 6.2 | bc.c | c | bc.b.o |
| ICELAND & FAEROE. | Isafjord... ... ... | 29.34 | 49 | S | 4 | r | 29.36 | * | 48 | −4 | S | 3 | c | * | * | * | * | | | | |
| | Reykjavik ... ... | 29.47 | 54 | SW | 7 | c | 29.46 | .00 | 46 | −3 | S | 7 | c | * | * | * | * | | | | |
| | Seydisfjord ... ... | 29.58 | 60 | E | 1 | b | 29.55 | .00 | 53 | −7 | WSW | 3 | b | * | * | * | * | | | | |
| | Thorshavn ... ... | 29.98 | 51 | WSW | 5 | c | 29.80 | +.03 | 50 | −2 | W | 6 | r | * | * | * | * | | | | |
| SCANDINAVIA. | Haparanda ... ... | 30.05 | 53 | W | 2 | b | 30.09 | .00 | 58 | +2 | SW | 2 | b | * | – | 64 | 46 | | | | |
| | Hernösand ... ... | 30.17 | 57 | – | 0 | b | 30.17 | −.03 | 59 | +5 | SSE | 4 | b | * | – | 63 | 43 | | | | |
| | Stockholm ... ... | 30.23 | 51 | WSW | 2 | c | 30.27 | +.02 | 61 | +7 | W | 2 | b | * | 0.04 | 61 | 46 | | | | |
| | Wisby ... ... ... | 30.25 | 54 | NNW | 2 | bc | 30.28 | +.02 | 62 | +3 | NW | 2 | b | * | Trace | 64 | 50 | | | | |
| | Karlstad ... ... | 30.23 | 58 | SW | 2 | b | 30.25 | .00 | 58 | +4 | SW | 4 | b | * | – | 68 | 50 | | | | |
| | Færder (X'tania Fjord) | 30.23 | 61 | SW | 2 | c | 30.22 | .00 | 61 | +6 | SSW | 4 | o | 2 | – | 61 | 55 | | | | |
| | Bodö ... ... ... | 30.15 | 48 | SSW | 2 | c | 29.98 | −.04 | 49 | +3 | E. | 4 | o | 2 | 0.12 | 50 | 43 | | | | |
| | Christiansund ... | 30.14 | 52 | – | 0 | o | 30.05 | −.01 | 57 | +7 | S | 1 | o | 1 | 0.12 | 57 | 46 | | | | |
| | Skudesnaes .. ... | 30.27 | 56 | SSW | 6 | o | 30.28 | +.01 | 55 | +2 | SSW | 2 | r | 2 | 0.12 | 55 | 52 | | | | |
| | The Scaw (Skagen)... | 30.28 | 55 | W | 4 | bc | 30.30 | +.01 | 58 | +1 | WSW | 3 | o | 1 | – | 61 | 52 | | | | |
| | Blaavands Huk ... | 30.38 | 57 | WNW | 3 | o | 30.38 | .00 | 60 | +4 | WSW | 2 | m | 2 | – | 61 | 55 | | | | |
| GERMANY, &c. | Cuxhaven ... ... | 30.41 | 60 | W | 3 | o | 30.44 | * | 58 | +1 | SW | 2 | o | * | – | 63 | 55 | | | | |
| | The Helder ... ... | 30.46 | 59 | WSW | 1 | c | 30.44 | +.01 | 61 | +3 | SSW | 1 | c | 1 | – | 63 | 55 | | | | |
| | Brussels ... ... | 30.46 | 58 | – | 0 | b | 30.47 | +.01 | 62 | +5 | SE | 1 | b | * | – | 71 | 47 | | | | |
| | Berlin ... ... | 30.40 | 63 | NW | 4 | c | 30.41 | +.01 | 60 | +5 | NW | 4 | b | * | – | 66 | 55 | | | | |
| | Frankfurt ... ... | 30.42 | 59 | N | 2 | b | 30.45 | +.01 | 58 | +5 | NE | 2 | b | * | – | 68 | 48 | | | | |
| | Munich ... ... | 30.39 | 58 | NE | 2 | b | 30.43 | +.01 | 55 | +3 | NE | 3 | b | * | – | 64 | 46 | | | | |
| FRANCE. | C. Gris Nez... ... | 30.47 | 62 | SW | 2 | b | 30.47 | +.02 | 59 | 0 | SSW | 2 | b | 2 | – | 66 | 50 | | | | |
| | La Hève ... ... | 30.48 | 62 | NE | 4 | b | 30.49 | * | ? | ? | NE | 1 | b | 1 | – | 64 | 57 | | | | |
| | Brest (St. Mathieu) ... | 30.49 | 63 | N | 4 | b | 30.50 | +.01 | 57 | +4 | NNE | 3 | b | 1 | – | 73 | 50 | | | | |
| | Lorient (Béc Melen)... | 30.41 | 72 | NE | 2 | b | 30.40 | * | 59 | +4 | ENE | 2 | b | 2 | – | 73 | 52 | | | | |
| | Rochefort (Ile d' Aix) | 30.34 | 75 | NE | 4 | b | 30.36 | * | 60 | 0 | NE | 4 | b | * | – | 82 | 55 | | | | |
| | Biarritz ... ... | 30.32 | 67 | WSW | 4 | b | 30.28 | * | 62 | −2 | SW | 4 | b | 2 | – | 68 | 61 | | | | |
| | Paris ... ... ... | 30.43 | 68 | NNE | 2 | b | 30.45 | .00 | 59 | +3 | NE | 2 | b | * | – | 71 | 48 | | | | |
| | Belfort ... ... ... | 30.38 | 65 | ENE | 4 | m | 30.40 | * | 57 | +6 | ENE | 6 | m | * | – | 68 | 45 | | | | |
| | Lyons ... ... ... | 30.29 | 69 | N | 3 | bc | 30.35 | * | 58 | +4 | N | 1 | b | * | – | 72 | 53 | | | | |
| | Nice ... ... ... | 30.14 | 72 | – | 0 | c | 30.12 | +.02 | 75 | +5 | E | 3 | b | 1 | – | 84 | 64 | | | | |
| | Perpignan .. ... | 30.16 | 79 | W | 2 | o | 30.21 | +.02 | 73 | −1 | – | 0 | b | * | – | 88 | 68 | | | | |
| | Sanguinaire ... ... | 29.98 | 75 | N | 2 | m | 30.02 | * | 75 | +3 | SW | 3 | m | 3 | – | 84 | 70 | | | | |
| SPAIN, PORTUGAL. | Corunna ... ... | 30.24 | 75 | NE | 1 | b | 30.25 | .00 | 65 | +1 | NE | 1 | f | 1 | – | 77 | 59 | | | | |
| | Lisbon (8 a.m. local)... | | | | | | | | | | | | | | | | | | | | |
| | Gibraltar ... .. | 30.08 | 71 | SE | 1 | b | 30.06 | * | 69 | +2 | E | 2 | c | * | – | * | * | | | | |
| | Azores (P. Delgada) (6 a.m. local). | | | | | | | | | | | | | | | | | | | | |
| | Azores (Horta) ,, | 30.48 | 66 | | 0 | o | 30.44 | +.01 | 69 | +1 | – | 0 | b | 1 | 0.16 | 75 | 63 | | | | |
| | Madeira (Funchal) ... | 30.23 | 68 | N | 3 | bc | 30.20 | +.01 | 68 | +1 | N | 3 | c | 3 | – | 68 | 57 | | | | |

DURATION AND EXTREME FORCE OF GALES ON BRITISH COASTS

* Information for these columns not usually received.

† Received too late for insertion in Charts.

# BAROMETER, WIND AND WEATHER FOR 7 A.M. AND 6 P.M. YESTERDAY.


Scale
Nautical Miles
Statute Miles
7 A.M.
LOW
29.4
29.5
29.7
29.9
30.1
30.3
30.5
HIGH
30.1
30.3
LOW
6 P.M.
LOW
29.4
29.5
29.7
29.9
30.1
30.3
Rain
has fallen
HIGH
30.5
30.3
30.1
30.0
LOW

NOTE.—On this chart a dotted line separates areas over which rain has fallen within the 24 hours from 7 a.m. from those without rain. Heavy falls are given in figures.

## NOTES ON YESTERDAY'S WEATHER.

During the past 24 hours slight rain fell in Scotland, Ireland and the north of England. Temperature rose to above 70° at Aberdeen, and in many places in the southeast of England. Large amounts of bright sunshine were recorded on the south coast, several places reporting over 14 hours. Further north the amounts were smaller, decreasing to zero in many places in North Wales, Lancashire, Ireland, and the west of Scotland. Yesterday morning's wireless reports showed moderate to fresh S.W.$^{ly}$ breezes as far west as 20° W. Long.

## WEATHER PROSPECTS.

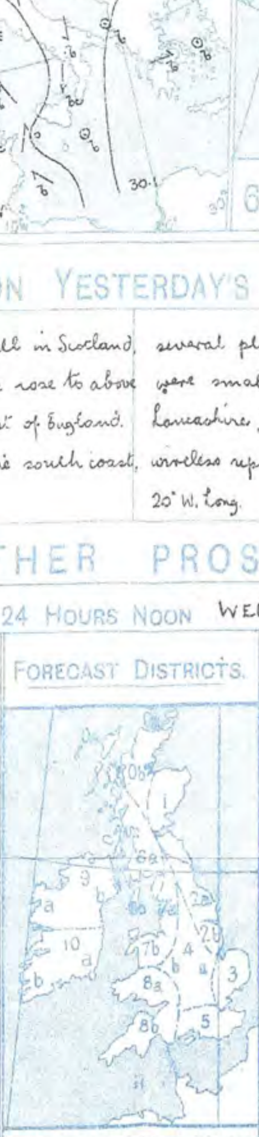
FORECASTS FOR THE 24 HOURS NOON WEDNESDAY TO NOON THURSDAY.

0 {a, b} S. W.$^{ly}$ to W.$^{ly}$ breezes, light to moderate; fair to dull, occasional rain. Rather warm.

1, 2 {a, b}, 3, 4 {a, b} Light or moderate W.$^{ly}$ breezes; generally fair or fine. Rather warm.

5 Light Variable to W.$^{ly}$ breezes; generally fair or fine. Rather warm

FORECAST DISTRICTS.


0a
0b
1
9
6a
6b
2a
2b
a
10
b
7a
7b
4
a
b
3
8a
8b
5

The Coasts upon which the Warning Signals are at present displayed are indicated thus:—

| Signals hoisted yesterday | Signals hoisted this morning |
|---|---|
| South Cone. ▽ | South Cone ▼ |
| North Cone. △ | North Cone. ▲ |

No Warnings issued

6 {a, b} Same as No. 0.

6, 7 {a, b} Same as Nos. 1 to 4.

8 {a, b} Same as No. 5.

9 {a} Same as No. 0.

9 {b}, 10 {a, b} Same as Nos 1 to 4.

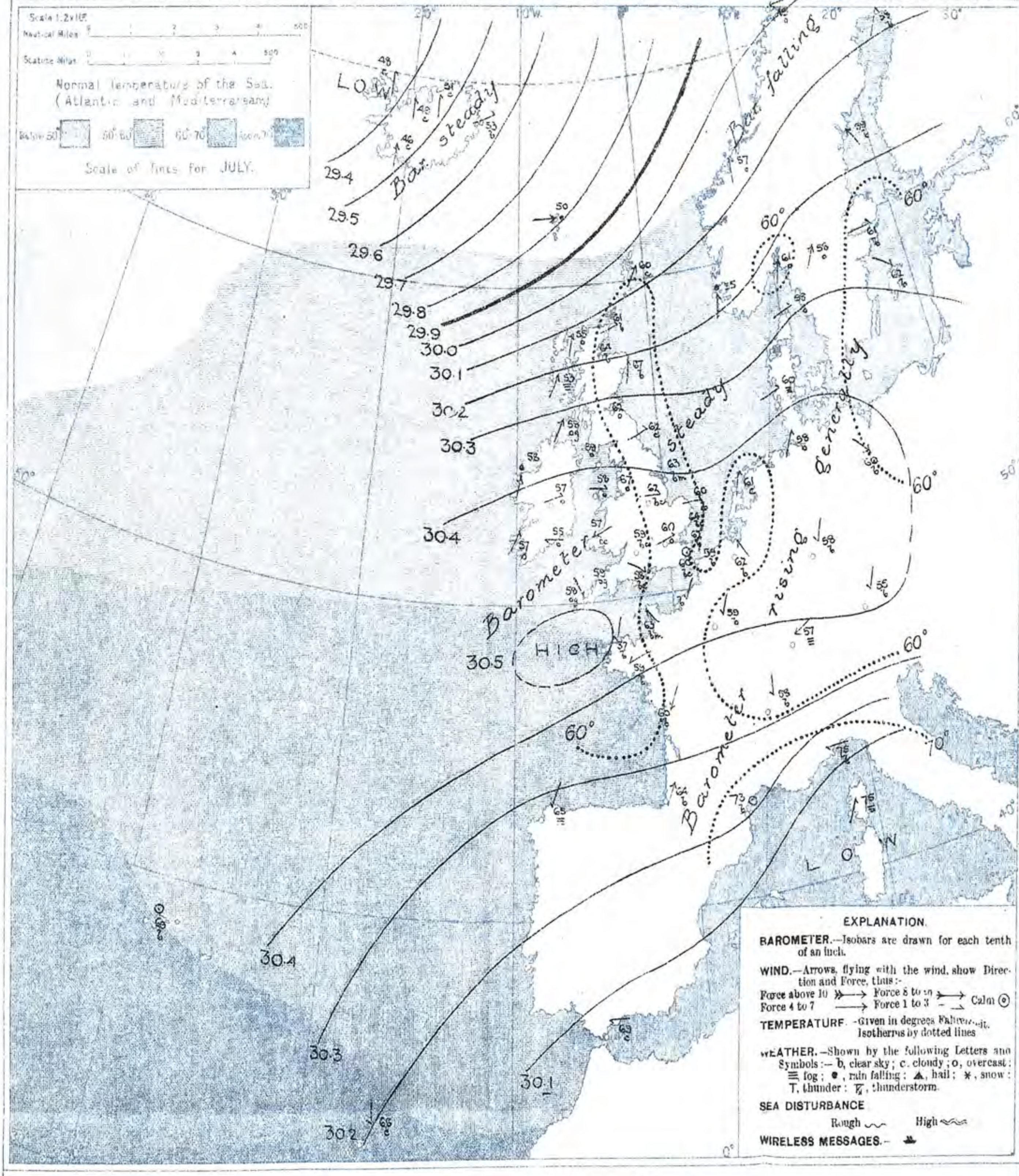
11 WESTERN CHANNEL AND BAY

Light Variable breezes over Channel. N.E.$^{s}$ over Bay; sea slight; generally fair or fine. Moderate temperature.

THE FURTHER OUTLOOK. DISTRICTS 2 to 5 & 8.

Similar conditions continuing.

# SYNOPTIC CHART FOR 7 A.M. Wednesday 5th JULY 1911.


Scale 1.2×10⁷
Nautical Miles 0 1 2 3 4 500
Statute Miles 0 1 2 3 4 500
Normal Temperature of the Sea. (Atlantic and Mediterranean)
Below 50° 50°-60° 60°-70° Above 70°
Scale of Tints for JULY.
20°
10°W.
20°
30°
60°
50°
40°
0°
LOW
Bar. steady
Bar. falling
Barometer steady
Barometer rising generally
Barometer rising
HIGH
LOW
29.4
29.5
29.6
29.7
29.8
29.9
30.0
30.1
30.2
30.3
30.4
30.5
30.4
30.3
30.2
30.1
60°
60°
60°
60°
60°
70°

EXPLANATION.

**BAROMETER.**—Isobars are drawn for each tenth of an inch.

**WIND.**—Arrows, flying with the wind, show Direction and Force, thus:-

Force above 10 ⟫⟶ Force 8 to 10 ⟶ Calm ⊙
Force 4 to 7 ⟶ Force 1 to 3 ⟶

**TEMPERATURE.**—Given in degrees Fahrenheit. Isotherms by dotted lines

**WEATHER.**—Shown by the following Letters and Symbols :— b, clear sky ; c. cloudy ; o, overcast ; ≡ fog ; ●, rain falling ; ▲, hail ; ✱, snow ; T, thunder ; T̸, thunderstorm.

**SEA DISTURBANCE**

Rough ∼ High ≈

**WIRELESS MESSAGES.**—

## NOTES ON THE GENERAL SITUATION AT 7 A.M.

An anticyclone, in which the highest reading is 30.5 in. over the mouth of the Channel, is still the dominating influence in the weather over the British Isles. Thence the barometer decreases to 30.12 in on the Riviera, and to below 29.4 in in the northwest of Iceland.

Light W.ly breezes prevail over the British Isles and the Scandinavian countries. Between Scotland and Iceland the wind is fresh from the same quarter. Light N.E.ly breezes are reported from the Bay of Biscay, France, and the west of Germany. Aberdeen reports a reading as high as 67°. Over the eastern part of England and Scotland the morning readings are above 60°. The Continental values have risen somewhat, but except on the shores of the Mediterranean they are not much above 60°.

The weather is fair or fine over the greater part of our area, but slight rain is reported from a few of our extreme northwestern stations. The sea is generally slight or smooth.

## GENERAL INFERENCE FROM THE 7 A.M. OBSERVATIONS.

The changes in pressure are slight and afford no indication of any decided change in the general weather conditions during the ensuing 24 hours. The anticyclone in the southwest will continue to dominate over the greater part of the British Isles.

# DAILY WEATHER REPORT. Wednesday, 5th July, 1911.

## OBSERVATIONS from the ATLANTIC OCEAN received by RADIOTELEGRAPHY.

| CONTROL OBSERVATIONS. | | | | | | | OBSERVATIONS PLOTTED ON THE CHARTS. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date and Hour of Observation. | Position. | | Reading of Barometer. | Wind. | | Name of Ship. | Date and Hour of Observation. | Position. | | Reading of Barometer. | Wind. | | Weather | Temperature. | | | Sea Disturbance |
| | Lat. N. | Long. W. | | Direc. | Force. | | | Lat. N. | Long. W. | | Direc. | Force. | | Air. Dry Bulb. | Air. Wet Bulb. | Sea. | |
| | ° | ° | In. | | | | | ° | ° | In. | | | | ° | ° | ° | |
| July 4th 3pm | 51 | 12 | 30.44 | Sw | 4-5 | Carmania | July 4th 6pm | 51 | 13 | 30.42 | Sw | 1-3 | c | | | | |
| " " 4am | 49 | 18 | 30.39 | Sw | 1-3 | Lapland | " " 7am | 48 | 20 | 30.41 | Sw | 6-7 | f | | | | |
| " " " | 50 | 16 | 30.43 | Sw | 1-3 | Campania | " " " | 50 | 14 | 30.46 | Sw | 4-5 | bc | | | | |
| " " " | 50 | 15 | 30.39 | SSw | 1-3 | Arabic | " " " | 50 | 15 | 30.39 | Sw | 1-3 | o | | | | |

## TEMPERATURE, WEATHER, SUNSHINE AND RAINFALL FOR YESTERDAY.

| STATIONS. | Temperature F. Max | Temperature F. Min. | Weather. | Sunshine. | Rainfall. | STATIONS. | Temperature F. Max. | Temperature F. Min. | Weather. | Sunshine. | Rainfall. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ° | ° | | Hrs. | In. | | ° | ° | | Hrs. | In. |
| Stonehaven, to 6 p.m. | * | * | * | 2.3 | - | Brighton, to 6 p.m. | 66 | 50 | * | 13.0 | - |
| Oban, to 6 p.m. | 56 | 50 | or o | 0.0 | 0.30 | †Seaford, to 6 p.m. | 65 | 55 | b | 12.3 | - |
| Douglas (I. of Man), to 6 p.m. | 57 | 51 | * | 0.0 | 0.01 | †Eastbourne, to 6 p.m. | 66 | 52 | * | 14.4 | - |
| Dublin (City), to 4 p.m. | 69 | 55 | op.c.o | * | 0.01 | Bexhill-on-Sea, to 9 p.m. | 66 | 53 | b | 13.2 | - |
| Blackpool, to 9 p.m. | 65 | 54 | o | 0.0 | 0.03 | †Hastings | * | * | * | 14.7 | * |
| Southport, to 9 p.m. | 62 | 54 | o.c.o | 0.0 | 0.06 | †Folkestone, to 6 p.m. | 68 | 51 | bc | 13.1 | - |
| †Rhyl, to 6 p.m. | 64 | 53 | bc.o | 0.3 | - | †Deal, to 6 p.m. | 70 | 50 | b.c.bc | 12.0 | - |
| Colwyn Bay, to 6 p.m. | 66 | 55 | o.bc.o | 0.3 | - | †Ramsgate, to 6 p.m. | * | * | * | 10.9 | - |
| Llandudno, to 9 p.m. | | | | | | †Margate, to 6 p.m. | 71 | 51 | b | 10.0 | - |
| Bettws-y-Coed, to 6 p.m. | | | | | * | †Felixstowe, to 6 p.m. | 70 | 54 | * | 11.9 | - |
| Aberystwyth, to 6 p.m. | 61 | 55 | * | 4.7 | - | †Lowestoft, to 6 p.m. | 72 | 56 | c.o.c | 7.8 | - |
| Plymouth, to 9 p.m. | 67 | 52 | bc.b | 14.4 | - | †Skegness, to 6 p.m. | 68 | 57 | c.bc | 4.2 | - |
| Paignton, to 6 p.m. | 69 | 51 | | 12.0 | - | Scarborough, to 9 p.m. | 64 | 51 | o.c.bc | 1.4 | - |
| Torquay, to 6 p.m. | 69 | 52 | * | 12.5 | - | †Harrogate, to 6 p.m. | 61 | 51 | c.o.c bc. | 1.9 | - |
| Teignmouth, to 9 p.m. | 67 | 53 | b | 13.0 | - | Buxton, to 6 p.m. | 63 | 56 | | 1.0 | - |
| †Weymouth, to 6 p.m. | 69 | 49 | bc.b | 10.8 | - | Darwen, to 9 p.m. | 61 | 50 | c.or.b.g | 0.0 | 0.01 |
| †Bournemouth, to 6 p.m. | 70 | 45 | c.bc.b | 9.2 | - | Manchester, to 9 p.m. | | | | | |
| Southsea, to 6 p.m. | 68 | 50 | * | 10.6 | - | Birmingham, to 9 p.m. | 66 | 49 | c.o | 0.5 | - |
| †Worthing, to 6 p.m. | 66 | 48 | c.b.c | 12.6 | - | Carnoustie, to 6 p.m. | 70 | 51 | * | 2.2 | 0.01 |

† At this station the amount of Bright Sunshine is for the whole day, ending with sunset.

## LONDON OBSERVATIONS.

| STATIONS. | Humidity. 3 p.m. Yesterday. | Humidity. 9 a.m. To-day. | Temperature. Max. | Temperature. Min. | Weather. | Rainfall. | Sunshine Yesterday. |
|---|---|---|---|---|---|---|---|
| | | | 24 Hours ended at 9 a.m. To-day. | | | | |
| | % | % | | | | In. | Hrs. |
| Greenwich (Royal Obsy.) | 50 | 63 | 75 | 57 | b. c. bc.c | - | 8.9 |
| City (Bunhill Row) | * | * | * | * | * | * | 6.2 |
| Westminster (St. James's Pk.) | 54 | 72 | 70 | 59 | bc. o | - | 7.5 |
| Camden Sq. (Brit. Rainfall) | 48 | 63 | 74 | 58 | b. o | - | 5.7 |
| Hampstead (Reservoir) | * | 73 | 67 | 56 | bc.o.c.o | - | 6.3 |
| | | | 24 Hours ended at 6 p.m. Yesterday. | | | | |
| South Kensington | * | * | 70 | 52 | c.o.bc.o.c.o | - | * |
| " " (Roof of M.O.) | 48 | 65 | 70 | 53 | | * | 7.0 |

Table showing the Greenwich Times of Sunrise, Noon and Sunset for Stations in the United Kingdom To-day and To-morrow.

| 5th + 6th July 1911. | Sunrise | Noon | Sunset |
|---|---|---|---|
| | G.M.T. | G.M.T. | G.M.T. |
| Yarmouth | 3.38<br>3.39 | 11.57<br>11.58 | 8.16<br>8.16 |
| Greenwich | 3.51<br>3.52 | 12.4<br>12.5 | 8.17<br>8.16 |
| Wick | 3.16<br>3.18 | 12.16<br>12.17 | 9.16<br>9.15 |
| Valencia | 4.29<br>4.30 | 12.45<br>12.46 | 9.1<br>9.0 |

## TEMPERATURE, WEATHER and RAINFALL at additional FOREIGN STATIONS, for the 24 hours ended at 7 a.m. yesterday.

| STATIONS. | Rain. | Temperature F. Max. | Temperature F. Min. | Weather. | STATIONS. | Rain. | Temperature F. Max. | Temperature F. Min. | Weather. |
|---|---|---|---|---|---|---|---|---|---|
| | In. | ° | ° | | | In. | ° | ° | |
| Flushing | 0.08 | 61 | 52 | b. b. | Florence | - | 90 | 66 | b. b |
| Copenhagen | - | 63 | 48 | b. c | Rome | - | 90 | 65 | b. b |
| Vardö (North Cape) | ? | 50 | 45 | r. r | Naples | - | 82 | 67 | b. b |
| St. Petersburg | 0.08 | * | 46 | r. b | Malta | - | 84 | 72 | b. |
| Vienna | 0.04 | 73 | 55 | o. b | Berne | - | * | * | c. c |
| Buda-Pesth | 0.47 | 77 | 63 | bc. o | Zürich | - | * | * | c. bc |
| Hermanstadt | - | 84 | 57 | o. o | Geneva | - | * | * | b. o |
| Trieste | - | 81 | 66 | bc. c | Lugano | - | * | * | b. c |

NOTE.—The information relating to weather is indicated by the following letters—b. blue sky; bc. sky half clouded; c. sky three parts clouded; d. drizzling rain; e. wet air, without rain falling; f. fog; g. gloom; h. hail; l. lightning; m. mist; o. overcast sky; p. passing showers; q. squalls; r. rain; s. snow; t. thunder; u. ugly, threatening sky; v. visibility, unusual transparency; w. dew; x. hoar frost; z. dust-haze, or smoke.

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Hydrographic notices have been extracted from the meteorological log-books of this Office and forwarded to the Admiralty. Among those sent this year were notes relating to the light and lighthouse at Cape St. Antonio, Cuba, received from Captain W. S. Jameson, S.S. *Saxon Prince.*

## II.—FORECAST AND STORM WARNING DIVISION.

*Report by R. G. K. Lempfert, M.A., Superintendent.*

**The Further Outlook.**—An important addition to the forecasts issued by the Office has been made since April 1st, 1910. Up to that date the forecasts had been limited to the period of 24 hours commencing at noon or midnight following the time of issue of the forecast. During the past year the forecasts have been supplemented by a "further outlook" giving the weather prospects for a longer period whenever the conditions have been sufficiently distinctive to justify this proceeding. Supplementary notices of this character have been issued in connexion with the morning forecasts on 118 occasions, and in connexion with the evening forecasts on 126 occasions. The results achieved are set out below, p. 32.

**Daily Weather Report.**—The arrangements for the issue of the Daily Weather Report and Forecasts, and for the preparation of information for publication in the newspapers, have remained generally the same as those which were in operation last year. Since January 1st, 1911, arrangements have been made for lithographing the Report at the Office, and a considerable saving of time has been achieved. The Report is now ready for distribution between 12.15 p.m. and 12.30 p.m. Advantage was taken of the change to revise the arrangement of the maps in the Report. In place of the two maps of pressure and temperature at 7 a.m. a single map is now given upon which isobars are shown by full lines, temperature by figures, and isotherms by dotted lines, so that all the information for 7 a.m. is shown on a single map. The scale of the new map is 1 : 20,000,000, and the maps for 7 a.m. and 6 p.m. "yesterday," which are on the opposite page, are on the scale of 1 : 40,000,000. In each case the area has been extended to take in the whole series of observations reported daily to the office. A table giving information for a number of stations in London has been added from January 1st. Provision has been made for showing the normal distribution of sea temperature for successive months over the Atlantic and Mediterranean, thus making use of the information collected in the Marine Division of the office for throwing light on the weather conditions as shown in the daily charts. The distribution of temperature is indicated by the depth of tint of blue colour used to mark a distinction between sea and land on the maps. Sea temperature is specially suitable for representation in this way because its variation from day to day is comparatively small.

**Telegraphic Reporting Stations.**—The stations from which telegraphic reports are received are shown in the lists given on pp. 78 to 102 and on Map (Fig. 13, p. 102). From January 1st the Central Observatory of the Office at Kew has contributed the London reports. By the courtesy of the Trustees of the British Museum, a station has been established in the grounds of the Natural History Museum the data from which for London are incorporated in the evening reports issued to the newspapers.

In consequence of the retirement of Mr. A. Hicks, who had acted as observer at Scilly for many years, the duties of observing at that station have been taken over by the Coast Guard.

From January 1st daily reports of observations at 7 a.m. and at 6 p.m. have been received from Newquay by the courtesy of the Urban District Council. The daily reports from Bath, Clacton-on-Sea, and Dover have been supplied for publication in the Daily Weather Report by the courtesy of the respective local authorities, as in previous years.

**Inspection of the Stations.**—The stations indicated in the list in Appendix VI., p. 135, have been inspected during the year. The reports of the inspectors show that efficiency has been maintained.

**Wireless Telegrams.**—During the year ended March 31st, 89 wireless telegrams were received from the ships of His Majesty's Navy ; 32 of these messages reached the Office in time to be included in the issue of the Daily Weather Report for the same day. All but seven were in time to be included in one or other of the maps in the report.

In the course of the twelve months ending with March, 1911, 3,955 wireless reports were received from Atlantic liners. The numbers in the several months ranged from 404 in May to 256 in December. Particulars of the number of messages received from each ship are given on p. 131. The number of messages is somewhat lower than the corresponding figure for the twelve months ending with March, 1910, viz., 4,388. This is to some extent due to the fact that from the middle of May, 1909 onwards, messages which reached the shore receiving stations more than 48 hours after the hour of observing have been sent on to the Meteorological Office by post, thus saving the charges for inland telegraphy. The totals for April and May of last year were in consequence unduly large.

Only 3·4 per cent. of the messages reached the Office in time to be included in "to-day's" map in the Daily Weather Report, *i.e.*, within about four hours of the time of taking the morning observations ; 39 per cent. of the messages reached the Office in time to be included in one of the two maps for "yesterday" shown in the Daily Weather Report. As the forecasts are prepared within from two to two and a half hours of the time of observing, it is evident that very few messages reached the Office in time to be of direct and immediate application in the preparation of forecasts or the issue of storm warnings. Nevertheless it is possible to cite a number of occasions on which the messages were of great assistance to the forecaster. Thus on January 28th a message which came to hand about noon showed that at 7 a.m. on that day a deep depression was in existence at some distance to the west of Ireland. Storm warnings were issued immediately to the west coast of Ireland, and in the course of the evening or night strong gales were experienced there. Again on the evening of Sunday, March 5th, two wireless messages were received as the forecasts were being drawn up. They revealed very clearly the V-shaped character of the depression then lying off our western coast which was not evident from the observations at land stations. The forecasts for all western districts were modified, in consequence, and proved to be accurate in all essential features. The wireless messages have also been of great service in connexion with the issue of the modifications of spells of settled weather referred to below. In this connexion messages which take a considerable time in transmission may still be of use if they show that there was no serious disturbance in existence over the Atlantic at the time when the observation was taken.

**Reports from Auxiliary Stations.**—The information as to the weather in the British Islands has been supplemented by postal and telegraphic reports sent daily from stations belonging to various local authorities. The information supplied has been included in the Daily Weather Report.

**Discussion of Information.**—A detailed account of the manner in which the meteorological information received by telegraph is utilised for the preparation of the Daily Weather Report is given in Appendix II., p. 61.

**Weather Forecasts.**—The means adopted for the distribution of the forecasts drawn up in the Office have been continued during the past year. They are detailed in Appendix II., p. 63.

**Forecasts for H.M. Ships.**—Forecasts have been supplied regularly to the Commander-in-Chief of the Home Fleet, to the Officers in Command at Devonport, Portland, and the Nore, and to the Naval Aeronautical Department at Barrow-in-Furness. From January 1st arrangements have been made, at the request of the Lords Commissioners of the Admiralty, for the preparation daily of a forecast message to be transmitted by wireless telegraphy to such of H.M. ships as may be within range.

**Harvest Forecasts.**—During the summer months the special service of afternoon forecasts for the benefit of agriculturists and others was arranged as in previous years, and special telegraphic reports of observations at 1 p.m. were obtained for this purpose. The forecasts referred to the period from 6 a.m. to 9 p.m. of the following day, regarded as the usual limits of an agricultural working day. Whenever the atmospheric conditions permitted, the forecast was supplemented by a "further outlook" giving the probable weather for one or more days in advance of the ordinary period.

In the course of the season applications for forecasts of the weather for agricultural purposes were received from 143 persons residing in various parts of the United Kingdom. The number was

40 in excess of that in the previous year, and 14 in excess of that in 1900, hitherto the highest on record. Of the 143 applicants :—

| | | | | |
|---|---|---|---|---|
| 12 | resided in | District | 2. | England, N.E. |
| 21 | „ | „ | 3. | England, E. |
| 28 | „ | „ | 4. | Midland Counties. |
| 37 | „ | „ | 5. | England, S.E. |
| 3 | „ | „ | 6. | Scotland, W. |
| 14 | „ | „ | 7. | England, N.W. |
| 22 | „ | „ | 8. | England, S.W. |
| 2 | „ | „ | 9. | Ireland, N. |
| 4 | „ | „ | 10. | Ireland, S. |

No applications were received from persons residing in the Channel Islands, or in the north and east of Scotland.

In 60 cases the ordinary daily forecasts only were required, but in 35 cases an application was made for special notification of approaching changes in the weather (*see* below), in addition to the ordinary forecasts. In 48 other cases special notifications only were required. Of the 95 persons who received daily forecasts 17 elected to receive the morning (10.30 a.m.) forecasts, eight persons the evening (8.30 p.m.) forecasts, and one person both the morning and evening forecasts. In the remaining 69 cases the 3.30 p.m. forecasts were transmitted. The total number of agricultural weather forecasts sent by wire from the Meteorological Office during the season was exactly 2,500.

Returns giving a daily record of the weather experienced during the period for which the forecasts were sent were received from 27 persons, as against 30 in 1909 and 25 in 1908.

The results of a comparison made in the Office between the forecasts and the subsequent weather, as entered on these returns, show that for the country generally 50 per cent. of the forecasts were completely successful, and 34 per cent. partially so. The percentage of completely successful forecasts was considerably higher than in 1909, but the total percentage of completely and partially successful forecasts was slightly lower. The highest proportion of complete successes, 56 per cent., was attained in the Midland Counties, and next to this in England, N.W., where the percentage value was as high as 52. The degree of success attending the issue of a "further outlook" was greater than in the case of the ordinary forecasts, the result for the country generally showing a percentage of complete success as high as 67. For England, N.W., the percentage was as high as 76.

**Notifications of a Spell of Fine Weather.**—Applications for a special notification of a probable spell of fine weather were numerous, and show a steady and rapid increase in the popularity of that branch of the service. In 1908 applications were received from only 22 persons, and in 1909 from 44 persons; in 1910 the number rose to 83. After the commencement of July the special notification included the issue of two notices, one announcing the probable commencement of a spell of fine weather; a second the probability of a renewal of unsettled conditions. Single notifications of the first description were sent to subscribers in various parts of the country between June 14th and 17th, and were attended by complete success. In all the districts to which notices were sent a spell of fine weather lasted until June 19th, and in most of them until June 21st. Double notifications were sent on July 7th and 9th, July 11th–13th and 15th, August 9th–10th and 11th, August 31st and September 2nd, and September 6th and 23rd–25th. The notice sent on July 7th was successful, but in many localities that of July 9th announcing a probable change to unsettled weather proved a failure. Those of July 11th–13th and 15th were in most districts entirely successful. The notice of an approaching spell of fine weather issued on August 9th–10th was not successful, inasmuch as on August 11th it was necessary to supplement it by a notice of an approaching change. The notice issued on August 31st of an approaching spell of fine weather was successful, but for most of the districts the issue of the subsequent notice on September 2nd was unnecessary, as the settled conditions lasted for several days. The notices issued on September 6th and September 23rd–25th were completely successful, the first announcing the approach of the longest spell of fine weather experienced during the whole of the season.

Favourable opinions as to the practical utility or as to the accuracy of the forecasts were expressed by many of the subscribers :—

Mr. G. Wailes, of Easingwold (District 2 A.), wrote : "I wish to return my best thanks for the information received, which has enabled me to get my hay crop in splendid condition."

Mr. C. T. Argles, of Ampthill (District 3), wrote : "The forecast service has been of the greatest assistance during this very trying haytime."

Mr. J. C. Viccars, of Oundle (District 3), wrote : "The forecasts evoked a good deal of interest in the neighbourhood among farming folk."

Miss E. I. Peyton, of Snitterfield, Stratford-on-Avon (District 4 A.), a recipient of special notifications only, wrote : "I thought it would interest you to know that your forecasts proved quite correct."

Mr. W. H. Gabb, of Worcester (District 4 B.), also a recipient of special notifications, wrote : "Your forecast for Friday, July 8th, and Saturday, July 9th, was very correct."

Mr. J. F. Symonds, of Hereford (District 4 B.), wrote : "I found the forecasts very correct in this district, and reaching me at 7.40 p.m., and with a study of the barometer, the correctness did me service."

Mr. A. Edmondson, of Dry Sandford, Abingdon (District 5), wrote : "The weather forecasts you sent were very interesting and generally correct, but I have come to the conclusion that they are not a great deal of use. Those, however, for a few days ahead are most useful, and what you sent me quite correct."

Mr. W. J. Passmore, of Shoreham (District 5), wrote: "The forecasts have been extremely good except just the last one, which did not prove correct."

Mr. R. Osmond, of Lambourn, Berks (District 5), wrote: The forecasts proved very occurate."

Lt.-Col. Tottie, of Bell Busk, Yorks (District 7 A.), wrote: "Farmers seem to appreciate having it posted up."

Mr. P. B. Barneby, of Trewyn, Abergavenny (District 8 A) wrote: "The forecasts were upon the whole very true, and were of some assistance. They would have been more so had the conditions been such as would have enabled you to give more hopeful ones."

Messrs. Thomson Bros., of Tregony, Cornwall (District 8 B), who have in several previous years spoken in commendatory terms of the forecasts, applied for occasional advice as to the desirability of cutting their hay. At the close of the service they wrote: "You have saved us pounds on our hay. Two large stacks alone would have been missed had we not had your warning saying the weather was changing."

**Other Forecasts.**—The arrangements for forecasts for Sea districts and for exceptionally high tides referred to in last year's report have been continued.

**Telegraphic Inquiries for Forecasts.**—The number of inquiries for forecasts (exclusive of harvest forecasts) by telegraph was 252.

**Results of Forecasts.**—A comparison for the year of the forecasts for the United Kingdom issued at 8.30 p.m., with the subsequent weather, is given below. The complete success, partial success, partial failure, and complete failure of the forecast as regards both wind and weather, are estimated according to definite rules which are designed to eliminate bias as far as possible.

The term "partial success" is applied to cases in which more than half the details included in the forecast are justified by subsequent events. With regard to *wind* the details comprise direction and force, and anticipated changes in either particular. With regard to *weather* they comprise temperature, the state of the sky (clear, cloudy, or overcast), and the probability of rain, snow, fog, thunder, &c., with occasional indications as to the duration or intensity of any or all of the phenomena mentioned. The term "partial failure" is applied in a similar way to a forecast in which more than half the details given are incorrect.

The detailed comparison of the forecasts with actuality for the year 1910 has been summarised to give results, (1) for the various months, and for the United Kingdom as a whole, and (2) for the various districts, and for the year as a whole.

## SUMMARY of RESULTS of 8.30 p.m. FORECASTS in 1910.

### *(a.) Results for the various Months.*

| Months. | Percentages. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Complete Success. | | | Partial Success. | | | Partial Failure. | | | Complete Failure. | | | Sum of Successes, Complete and Partial. |
| | Wind. | Weather. | Average. | Wind. | Weather. | Average. | Wind. | Weather. | Average. | Wind. | Weather. | Average. | |
| January ... ... | 52 | 64 | 58 | 39 | 25 | 32 | 8 | 10 | 9 | 1 | 1 | 1 | 90 |
| February ... ... | 52 | 57 | 55 | 37 | 38 | 37 | 10 | 5 | 8 | 1 | – | – | 92 |
| March ... ... | 70 | 59 | 65 | 27 | 37 | 32 | 1 | 4 | 2 | 2 | – | 1 | 97 |
| April ... ... | 60 | 54 | 57 | 33 | 38 | 36 | 1 | 6 | 3 | 6 | 2 | 4 | 93 |
| May ... ... | 64 | 52 | 58 | 32 | 38 | 35 | 3 | 8 | 6 | 1 | 2 | 1 | 93 |
| June ... ... | 66 | 60 | 63 | 29 | 33 | 31 | 1 | 5 | 3 | 4 | 2 | 3 | 94 |
| July ... ... | 72 | 46 | 59 | 24 | 44 | 34 | 3 | 9 | 6 | 1 | 1 | 1 | 93 |
| August ... ... | 57 | 45 | 51 | 31 | 44 | 38 | 6 | 7 | 9 | 6 | 2 | 4 | 89 |
| September ... | 72 | 50 | 61 | 20 | 38 | 29 | 3 | 9 | 6 | 5 | 3 | 4 | 90 |
| October ... | 63 | 53 | 58 | 30 | 42 | 36 | 5 | 4 | 5 | 2 | 1 | 1 | 94 |
| November ... | 62 | 62 | 62 | 29 | 30 | 30 | 5 | 7 | 6 | 4 | 1 | 2 | 92 |
| December ... | 66 | 74 | 70 | 32 | 24 | 28 | 1 | 2 | 1 | 1 | – | 1 | 98 |
| The entire Year | 63 | 56 | 60 | 30 | 36 | 33 | 4 | 6 | 5 | 3 | 1 | 2 | 93 |

### *(b.) Results for the various Districts.*

| Districts. | Percentages. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Complete Success. | | | Partial Success. | | | Partial Failure. | | | Complete Failure. | | | Sum of Successes, Complete and Partial. |
| | Wind. | Weather. | Average. | Wind. | Weather. | Average. | Wind. | Weather. | Average. | Wind. | Weather. | Average. | |
| Scotland, N. ... | 70 | 60 | 65 | 25 | 35 | 30 | 3 | 4 | 4 | 2 | 1 | 1 | 95 |
| " E. ... | 61 | 54 | 58 | 32 | 37 | 35 | 3 | 7 | 5 | 4 | 2 | 2 | 93 |
| England, N.E. ... | 61 | 55 | 58 | 33 | 36 | 35 | 3 | 7 | 5 | 3 | 2 | 2 | 93 |
| " E. ... | 64 | 51 | 58 | 30 | 40 | 35 | 3 | 8 | 5 | 3 | 1 | 2 | 93 |
| Midland Counties. | 66 | 53 | 60 | 27 | 40 | 33 | 3 | 6 | 5 | 4 | 1 | 2 | 93 |
| England, S.E. ... | 69 | 51 | 60 | 26 | 41 | 34 | 2 | 7 | 4 | 3 | 1 | 2 | 94 |
| Scotland, W. ... | 62 | 61 | 62 | 28 | 30 | 29 | 7 | 7 | 7 | 3 | 2 | 2 | 91 |
| England, N.W. ... | 62 | 61 | 62 | 31 | 31 | 31 | 5 | 7 | 6 | 2 | 1 | 1 | 93 |
| " S.W. ... | 67 | 57 | 62 | 28 | 34 | 31 | 3 | 8 | 6 | 2 | 1 | 1 | 93 |
| Ireland, N. ... | 57 | 61 | 59 | 36 | 35 | 36 | 4 | 4 | 4 | 3 | – | 1 | 95 |
| " S. ... | 53 | 59 | 56 | 36 | 35 | 36 | 7 | 5 | 6 | 4 | 1 | 2 | 92 |
| Summary ... | 63 | 56 | 60 | 30 | 36 | 33 | 4 | 7 | 5 | 3 | 1 | 2 | 93 |

The following table shows the success of the Forecasts of the year in comparison with those of previous years. It gives for each year of the decade 1901–1910 the percentages of complete and partial successes of the Forecasts issued at 8.30 p.m. Until the year 1905 the annual period included was that for the 12 months ending with March. The results for 1905 to 1910, given below, are for the calendar year. The sum of successes (complete and partial) in 1910 was as high as in 1909, and higher than in any other year included in the record. The percentage of complete success was higher than in 1909, or in any other year excepting 1906.

PERCENTAGES of SUCCESS in the FORECASTS for the whole of the BRITISH ISLES.

| Year. | Complete Success. | Partial Success. | Sum of Successes, Complete and Partial. |
|---|---|---|---|
| 1901–02 ... | 58 | 26 | 84 |
| 1902–03 ... | 53 | 35 | 88 |
| 1903–04 ... | 56 | 30 | 86 |
| 1904–05 ... | 57 | 31 | 88 |
| 1905 ... ... | 56 | 32 | 88 |
| 1906 ... ... | 61 | 30 | 91 |
| 1907 ... ... | 54 | 37 | 91 |
| 1908 ... ... | 58 | 34 | 92 |
| 1909 ... ... | 58 | 35 | 93 |
| 1910 ... ... | 60 | 33 | 93 |
| Average ... | 57·1 | 32·3 | 89·4 |

A "further outlook" was appended to the forecasts for 24 hours on 241 occasions. 116 of these notifications were issued in connexion with morning forecasts and 125 in connexion with evening forecasts. 43 referred to a change or a partial change of the type of weather. The remainder notified the probable continuance of existing conditions. 86 per cent. of the notifications were justified by the subsequent weather.

## STORM WARNINGS FOR THE COASTS OF THE UNITED KINGDOM.

Warnings of coming storms have been dispatched by telegraph to stations on the coast supplied with signals to be hoisted as warnings to mariners. An explanation of the system of signals employed is given in Appendix II.

A list of the stations at which the signals are exhibited is given in Appendix II., pp. 67, 68. At the end of March, 1911, there were 233, of which 123 were in England and Wales, 72 in Scotland, 33 in Ireland, 3 in the Isle of Man, and 2 in the Channel Islands.

A comparison between the warnings issued during the year and the subsequent weather, in accordance with the method indicated in the Report for 1888–9, p. 64, is given in the following table.

Appended to the table are notes respecting the gales for which no warnings were issued, with brief statements as to the circumstances in which they occurred.

## STORM WARNING CHECKING.

### *Comparison between the Warnings and the subsequent Weather in* 1910.

| Coasts | Total No. of Warnings. | Warnings justified by subsequent Gales. Force 8 and upwards. | Warnings justified by subsequent strong Winds. Forces 6 & 7. | Warnings not justified by subsequent Weather. | Warnings late. Force 9 reached at two Stations before issue. | Warnings partially late. Force 9 reached at one Station before issue. | Storms for which no Warning was issued. |
|---|---|---|---|---|---|---|---|
| Scotland, N.E. ... ... | 33 | 13 | 15 | 4 | 1 | — | Apr. 13–14. |
| | 24 | 9 | 9 | 4 | 1 | 1 | |
| „ E. ... ... | 15 | 5 | 6 | 4 | — | — | |
| | 14 | 3 | 5 | 6 | — | — | |
| „ N.W. ... ... | 33 | 13 | 15 | 4 | — | 1 | |
| | 24 | 8 | 9 | 5 | — | 2 | |
| „ W. ... ... | 28 | 9 | 14 | 4 | — | 1 | |
| | 21 | 4 | 11 | 6 | — | — | |
| Irish Sea ... ... ... | 36 | 23 | 11 | 2 | — | — | |
| | 32 | 15 | 14 | 3 | — | — | |
| Ireland, N. ... ... ... | 39 | 23 | 10 | 6 | — | — | |
| | 34 | 16 | 10 | 5 | 1 | 2 | Oct. 12 ;<br>Dec. 26. |
| „ S. ... ... ... | 37 | 23 | 8 | 5 | 1 | — | Jan. 24. |
| | 39 | 20 | 12 | 6 | — | 1 | |
| St. George's Channel ... | 32 | 21 | 9 | 2 | — | — | |
| | 32 | 17 | 10 | 4 | — | 1 | Oct. 2–3 ;<br>Oct. 12. |
| Bristol Channel ... ... | 35 | 25 | 7 | 2 | — | 1 | |
| | 38 | 25 | 9 | 4 | — | — | |
| England, S.W. ... ... | 30 | 19 | 9 | 1 | 1 | — | Jan. 24. |
| | 39 | 23 | 12 | 3 | — | 1 | Oct. 2–3. |
| „ S. ... ... | 31 | 17 | 10 | 2 | — | 2 | |
| | 36 | 21 | 14 | 1 | — | — | Oct. 2–3 ;<br>Nov. 30. |
| „ S.E. ... ... | 24 | 11 | 13 | — | — | — | Jan. 24. |
| | 31 | 15 | 13 | 3 | — | — | Oct. 2–3 ;<br>Nov. 30. |
| „ N.E. ... ... | 20 | 11 | 8 | — | — | 1 | |
| | 22 | 10 | 8 | 3 | — | 1 | |
| „ E. ... ... | 17 | 11 | 5 | 1 | — | — | Jan. 24. |
| | 24 | 9 | 15 | — | — | — | |
| Totals ... ... | 410 | 224 | 140 | 37 | 3 | 6 | |
| | 410 | 195 | 151 | 53 | 2 | 9 | |
| Percentages ... | — | 54·6 | 34·2 | 9·0 | 0·7 | 1·5 | |
| | — | 47·6 | 36·8 | 13·0 | 0·5 | 2·1 | |
| For whole year: Totals ... ... | 820 | 419 | 291 | 90 | 5 | 15 | |
| For whole year: Percentages ... | — | 51·1 | 35·5 | 11·0 | 0·6 | 1·8 | |

NOTE.—In order to facilitate comparison with the statistical tables of the Board of Trade which are made up for the year ending June 30, the figures for the two halves of the year 1910—January 1 to June 30, and July 1 to December 31—are given separately for each district. The upper line of figures in each case gives the particulars for the first half of the year.

## GALES EXPERIENCED in 1910 WITHOUT WARNING.

(1) *January* 24*th.* *A gale from between South-West and North-West on our South-West Coasts and in the East and South East of England.*—Warnings were issued at 8·30 a.m. on

January 24th to all coasts excepting the east and south east of England, but in Ireland south and England south-west the gale had already commenced. The gale was caused by a large and deep depression which advanced rapidly from the north westward. At 6 p.m. on January 23rd the centre was about 250 miles to the southward of Iceland, and the winds on our coasts were light to fresh from between South and West excepting in the Channel, where the West wind blew strongly. By the following morning the centre had reached the Irish Sea and the warnings issued to our south west coasts proved too late.

(2) *April* 13*th*–14*th*. *A strong gale from the North-Eastward in the Northern Islands of Scotland.*—Warnings were issued at 7 p.m. on April 13th to the north-east and north-west of Scotland, but in outlying portions of the former district the gale had already commenced. An elongated depression lay over the United Kingdom, and an anticyclone extended slowly southwards from Iceland, causing a gradual and unexpected increase in the barometric gradient on our extreme northern coasts.

(3) *October* 2*nd*–3*rd*. *A gale from between South-West and North-West on the West, South and South-East coasts of Great Britain.*—Warnings were issued at 7.20 p.m. on October 1st to Ireland and the west and north of Scotland, but the gale extended next day to the coasts indicated. The extension was due to a "V-shaped" secondary system which increased in depth as it passed north-eastwards across England. In the Channel the gale was confined to the English coast—50 miles out the wind did not exceed force 7.

(4) *October* 12*th*–13*th*. *A fresh to strong gale from the Northward in the North of Ireland and the St. George's Channel.*—Warnings were issued to these coasts on October 13th at 9.30 a.m., but in some places the gale had commenced during the previous night. The gale was due to the movement of a depression *westwards* along the Channel, and to the simultaneous advance of a large anticylone from the Atlantic towards the north of Scotland. The east and south-east coasts of England were warned on the evening of October 12th, but the conditions did not then appear sufficiently threatening to justify the issue of warnings to any part of our western coasts.

(5) *November* 30*th*. *A gale from the North-Eastward in the South and South-East of England.*—Caused by pressure changes of a very similar character to those last mentioned. A depression hung over the Bay of Biscay and the west of France, while an anticyclone advanced southwards from Iceland. The resulting increase in the barometric gradient was greatest over our south and south-east coasts, and was quite unexpected.

(6) *December* 26*th*–27*th*. *A gale from the Northward and North-Westward in the North West of Scotland and the North of*

*Ireland.*—Warnings were issued to all coasts on the morning of December 27th, but from information received later it appeared that in the districts indicated the gale had commenced during the preceding night. The gale was due to the extension of a complex area of low pressure from northern Europe as far south as central and southern France. At 6 p.m. on December 26th the indications did not appear sufficiently threatening to justify the issue of warnings.

**Comparison of results for 1910 with previous years.**—The following table contains a statement of the amount of success of storm warnings in each year, and the average, for the decade 1901–1910:—

| Years. | Total No. of Warnings issued. | Warnings justified by subsequent Gales. | Warnings justified by subsequent strong Winds. | Total Warnings justified. | Warnings not followed by increase of Wind. |
|---|---|---|---|---|---|
| | | p.c. | p.c. | p.c. | p.c. |
| 1901 ... ... | 498 | 62·3 | 26·1 | 88·4 | 7·4 |
| 1902 ... ... | 535 | 55·5 | 32·0 | 87·5 | 9·0 |
| 1903 ... ... | 757 | 62·6 | 27·3 | 89·9 | 7·3 |
| 1904 ... ... | 539 | 59·4 | 30·4 | 89·8 | 6·7 |
| 1905 ... ... | 632 | 52·5 | 35·9 | 88·4 | 9·5 |
| 1906 ... ... | 739 | 54·7 | 33·3 | 88·0 | 8·5 |
| 1907 ... ... | 573 | 55·2 | 37·0 | 92·2 | 5·9 |
| 1908 ... ... | 628 | 53·4 | 32·3 | 85·7 | 10·7 |
| 1909 ... ... | 458 | 48·9 | 36·9 | 85·8 | 8·5 |
| 1910 ... ... | 820 | 51·1 | 35·5 | 86·6 | 11·0 |
| 1901–10 ... | 618 | 55·6 | 32·7 | 88·2 | 8·5 |

**Averages.**—The corresponding figures, giving the average results for the last ten years and for the three preceding decades, are as follows:—

| Period. | Total No. of Warnings issued. | Warnings justified by subsequent Gales. | Warnings justified by subsequent strong Winds. | Total Warnings justified. | Warnings not followed by increase of Wind. |
|---|---|---|---|---|---|
| | | p.c. | p.c. | p.c. | p.c |
| 1871–80 ... | 362 | 51·9 | 25·7 | 77·6 | 16·8 |
| 1881–90 ... | 507 | 57·3 | 25·1 | 82·4 | 15·5 |
| 1891–1900 ... | 518 | 62·7 | 27·5 | 90·2 | 5·8 |
| 1901–10 ... | 618 | 55·6 | 32·7 | 88·2 | 8·5 |

## III.—STATISTICS AND LIBRARY DIVISION.

*Report by E. Gold, M.A., Superintendent.*

### CLIMATOLOGY OF THE BRITISH ISLES.

**Distribution of Stations.**—A list of stations in connexion with the Office, in which particulars are given of the orders of the stations and of the official publications for which the returns have been prepared, will be found in Appendix II. on pp. 78 to 100.

**Clarendon** type has been used for the names of stations which have been added to the list in the course of the year.

The distribution of these stations in the various districts may be summarised as follows :—

| — | Observatories. | Normal Climatological. | Auxiliary Climatological. | Telegraphic Reporting. | Sunshine (including Observatories). | Additional Rainfall. | Additional Anemograph. | Additional Barograph. |
|---|---|---|---|---|---|---|---|---|
| 0. Scotland, N. ... ... | 0 | 7 | 2 | 4 | 7 | 4 | 1 | 6 |
| 1. ,, E. ... ... | 1 | 6 | 4 | 3 | 10 | 2 | 1 | 3 |
| 2. England, N.E. ... ... | 0 | 11 | 8 | 2 | 13 | 7 | 2 | 3 |
| 3. ,, E. ... ... | 0 | 8 | 6 | 2 | 12 | 13 | 3 | 3 |
| 4. ,, Midlands ... | 0 | 13 | 21 | 3 | 18 | 14 | 1 | 3 |
| 5. ,, S.E. ... ... | 0 | 7 | 26 | 2 | 26 | 17 | 3 | 4 |
| London District ... | 1 | 4 | 5 | 1 | 9 | 2 | 1 | 3 |
| 6. Scotland, W., and Isle Man. | 2 | 7 | 4 | 0 | 8 | 3 | 0 | 2 |
| 7. England, N.W., and N. Wales. | 1 | 11 | 10 | 2 | 21 | 6 | 4 | 4 |
| 8. England, S.W., and S. Wales. | 1 | 5 | 17 | 3 | 20 | 25 | 2 | 1 |
| 9. Ireland, N. ... ... | 0 | 3 | 2 | 3 | 2 | 5 | 1 | 5 |
| 10. ,, S. ... ... | 1 | 7 | 9 | 3 | 6 | 9 | 3 | 3 |
| 11. Western Channel ... | 0 | 1 | 1 | 2 | 4 | 0 | 1 | 1 |
| Total ... ... | 7 | 90 | 115 | 30* | 156 | 107 | 23 | 41 |

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* Of these, 13 observe at 7 a.m., 1 p.m., and 9 p.m., and thus come under the international definition of a station of the second order. These stations have not been included in the 90 normal climatological stations. Aberdeen and Valencia are given under Observatories and under Telegraphic Reporting Stations.

Records have also been received from 5 additional thermograph stations, 8 additional autographic raingauge stations, 1 hygrograph station, 61 sea temperature stations. Daily reports are received by telegraph from 39 foreign stations (*see* p. 101).

Observatories are also maintained at Greenwich (The Royal Observatory), Oxford (Radcliffe Observatory), Bidston (Mersey Docks and Harbour Board), Southport (the Corporation), and Berkhamsted (E. Mawley, Esq.), and from these, records for occasions of special interest have been courteously supplied when asked for.

**Changes in Stations.**—The normal climatological station at Laudale, which contributed data to the annual volumes of "Observations at stations of the second order" from 1879 to 1909, has been discontinued. The normal climatological station at Tillypronie, from which returns were received through the Scottish Meteorological Society, has also been discontinued. Its place has been taken by Kingussie in the Monthly Weather Report and by Fort William in "Daily Readings at Stations of the First and Second Orders."

Among the stations which have been started or have come into connexion with the Office during the year, must be mentioned a normal climatological station at Insch, Aberdeenshire, and a normal climatological station at Bromyard, Hereford. The following auxiliary climatological stations have been added to the list: Sevenoaks, Eltham, Chopwellwood (Durham).

The normal climatological station previously maintained at Stokesay has been transferred to Wistanstow since August, 1910. The Rev. W. M. D. la Touche continues as observer.

**Obituary.**—The Committee have noted with regret the death of the following observer:—

Dr. R. A. O'Donovan, M.O.H., who contributed observations from Kingstown. The observations are being continuued by Mr. J. S. Vaughan, LL.D.

**Inspections.**—A list of stations inspected during the year by representatives of the Office is given in Appendix VI., p. 135.

**Publications.**—The statistical publications of the Office have been grouped together under the general title "The British Meteorological Year Book." All four parts of this publication for 1910 were issued before the end of the financial year.

Part I., the Weekly Weather Report, has been issued with three appendices in the same form as in the previous year. A special supplement has been included in which the year's observations in the upper air have been summarised for Pyrton Hill, Ditcham Park, Brighton and Manchester.

Part II., the Monthly Weather Report. From the beginning of 1911 the table, summarizing the wind observations, contains instead of the actual number of observations the number multiplied by 3 where only one observation a day is made and by $\frac{3}{2}$ for two observations a day. It is hoped that by this change the results for different stations will be more easily comparable. A table summarizing the observations of sea-temperature was added to the Annual Summary for 1910. The rainfall maps have been supplied as in previous years by the Director of the British Rainfall Organization. They are constructed from data from nearly 1,000 stations, and form a most important feature of the Reports.

Part III., "Meteorological Observations at Stations of the Second Order and at Anemograph Stations," has been issued regularly within six weeks of the close of each month. It contains daily observations at 20 Climatological Stations and an abstract of the tabulations from selected Anemograph Stations. From the beginning of 1911, the monthly issue has been divided into two sections of which the first contains the daily observations at 16 Climatological Stations, and the second contains daily meteorological, magnetic, electrical, solar and seismic data for Kew and Eskdalemuir, meteorological and magnetic data for Valencia and values of the wind components for four hours each day for Deerness, Holyhead, Scilly and Yarmouth. The title of the first part has been changed to "Daily Readings at Stations of the First and Second Orders," and the second part has been named the "Geophysical Journal."

Part IV., "Hourly Readings at four Observatories in connexion with the Meteorological Office" (*see* p. 17).

**Arrears.**—The arrears of the Annual Volumes of "Observations at Stations of the Second Order" have at last been entirely cleared off. The Volume for 1907 was issued at the beginning of December 1910.

**Returns for Registrar-General.**—Weekly and quarterly summaries have been prepared regularly for the Registrar-General of Births, Deaths, and Marriages for England and Wales and for Ireland. No change has been made in the form of these reports.

**Seasons in the British Isles.**—Further progress has been made with the preparation of the Report on the Seasons in the British Isles referred to on p. 35 of the report for last year, but it has been impossible to complete the work, and as 1910 was the last year of a lustrum it is proposed to complete the tables to the end of that year.

## CLIMATOLOGY. FOREIGN AND COLONIAL STATIONS.

A list of Foreign and Colonial Stations from which documents have been received in the course of the year is given in Appendix II., p. 103.

Among the additions to the list during the year under review may be mentioned stations started in

Uganda—Kawolongoja, Kivuvu.
Somaliland—Berbera, Sheikh Camp Hospital, Zaila.

The returns received from many stations have been examined and summarised month by month.

## INQUIRIES.

The inquiries dealt with in the Statistics and Library Branch during the year were 876, of which 351 were by letter and the rest personal inquiries. The following table gives a classification of the inquiries with the corresponding figures for previous years :—

| — | For Scientific or Commercial Purposes. | For Evidence in Legal Proceedings. | For Forecasts of Weather. | From Newspaper Correspondents for Special Information. | Miscellaneous. | Answered by Letter. | Answered Personally. |
|---|---|---|---|---|---|---|---|
| 1903-4 ... | 258 | 94 | 158 | 217 | 65 | 166 | 626 |
| 1904-5 ... | 259 | 116 | 89 | 221 | 70 | 136 | 619 |
| 1905-6 ... | 293 | 99 | 77 | 206 | 84 | 160 | 599 |
| 1906-7 ... | 427 | 73 | 79 | 166 | 24 | 247 | 522 |
| 1907-8 ... | 503 | 83 | 108 | 175 | 24 | 305 | 588 |
| 1908-9 ... | 540 | 99 | 83 | 99 | 87 | 301 | 607 |
| 1909-10 ... | 469 | 98 | 104 | 112 | 39 | 305 | 517 |
| 1910-11 ... | 516 | 107 | 76 | 115 | 62 | 351 | 525 |

The inquiries included in the table under the heading "for forecasts of weather" are personal inquiries for information supplementary to that contained in the official forecasts and exhibited at the entrance to the Office and in St. James's Park.

## EXCHANGE OF PUBLICATIONS.

Exchanges of publications have been arranged with the following :—

Öffentliche Wetterdienststelle Frankfurt a. Main.
Ufficio Idrografico de R. Magistrato Alle Acque, Venice.
Instituto Nacional Fisico Climatologico, Montevideo.

## LIBRARY.

The subject card catalogue for the books added to the library since the last list of additions was printed *in extenso*, as an appendix to the Report of the Meteorological Council for the year 1904-5, has been kept up to date. The classification adopted is that of the

International Catalogue of Scientific Literature. The additions to the library received during the past year, about 600 books and pamphlets, have been catalogued on this system. The total number of books in the library is now about 22,000.

In Appendix VII., p. 137, will be found (1) a list of persons and institutions from whom publications containing meteorological data have been received during the last five years with a brief indication of the nature of the information given; (2) a list of periodicals containing memoirs on meteorological subjects, which are received by the Office.

Among the most important additions to the library during the past year may be mentioned :—

> Annales de l'Observatoire National, Athens, Tome 5; Report of the Maryland Weather Service, vol. 3; Rainfall of India, 1909; Climate of the Argentine Republic, by W. G. Davis; Ole Römers Adversaria med understöttelse af Carlsbergfondet, udgivne af det Kgl. Danske Videnskabernes Selskab; Atlas météorologique, 1909, par G. Eiffel; Expédition Antarctique Belge, 1897–99, vols. 3, 4, 5; Mission scientifique du Ka-Tanga, 17$^{e}$ mémoire; Wissenschaftliche Ergebnisse der Schwedischen Südpolar Expedition, 1901–1903, Bd. 2, Lief. 4; Rapport sur l'expédition polaire néerlandaise qui a hiverné dans la Mer de Kara en 1882–83; Travaux scientifiques de l'Observatoire de Météorologie Dynamique de Trappes, Tomes 1, 3, 4; Southern hemisphere surface-air circulation, by W. J. S. Lockyer.

Among those acquired by purchase have been :—

> Tägliche synoptische Wetterkarten für den nordatlantischen Ozean, 1903–4; The atmosphere, its characteristics and dynamics, by F. J. B. Cordeiro; Waves of the sea and other waves, by Vaughan Cornish; Deutsche Klimatik, von K. Dove und Frankenhäuser; La vie sur les hauts plateaux, par A. L. Herrera et D. Vergara Lope; Die Veranderungen des Klimas seit dem Maximum der letzten Eiszeit (Internationaler Geologenkongress); Handbuch der Ozeanographie, von Otto Krümmel, Bd. 2; Hydrodynamics, by H. Lamb; Meteorology, by Sir John Moore, 2nd ed.; Descriptive meteorology, by Willis Moore; The heart of the Antarctic, by E. H. Shackleton, vols. 1 and 2; An introduction to the theory of Statistics, by G. Udny Yule; The Encyclopædia Britannica; and a selection of the volumes of the International Catalogue of Scientific Literature.

The library is available for the use of students and others between the hours of 10 a.m. and 4 p.m. A number of persons have availed themselves of this accommodation.

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## IV.—INSTRUMENTS DIVISION.

*Report by R. H. Curtis, Superintendent.*

### SUPPLY OF INSTRUMENTS.

**Supply to the Navy.**—The number of instruments supplied to ships of the Royal Navy during the year was 1,047, as compared with 810 last year.

**The Mercantile Marine.**—To the Mercantile Marine 676 instruments were issued during the year, a decrease of 205 compared with the number supplied in the previous year. 190 thermometers, 170 hydrometers, and 35 screens have been written off the books as broken, lost, or irrecoverable. Meteorological instruments for the use of the Antarctic Expedition under Captain R. F. Scott, R.N., were issued to the "*Terra Nova*"; a set of instruments showing the outfit of a Climatological Station was lent for Exhibition at the Leeds Agricultural show; a Thermograph, and Small Cup Anemometer were lent for experimental purposes to Capt. Dampier, R.N., H.M.S. "Defence," to be used on a voyage to the Cape and back; and a set of instruments was also issued to Dr. Lockyer for use with the British Solar Eclipse Expedition in the Pacific.

The removal of the Office to South Kensington has necessitated a good deal of alteration and reorganization of the instruments used for the daily observations made as part of the Office routine.

**Colonial Governments.**—The number of instruments of all kinds supplied on repayment through the Crown Agents for the Colonies, or direct to Colonial Governments, amounted to 1,465 as compared with 568 in the preceding year, whilst charts for recording instruments, registers, and other books amounted to 7,352, as compared with 13,409.

Requisitions from the following Colonies were complied with :—

The Commonwealth of Australia (3), Transvaal (3), British South Africa, Fiji, Hong Kong, Gibraltar, Federated Malay States (2), Mauritius, Jamaica, Bahamas, Gold Coast (2), Uganda, Bermuda, Northern Nigeria (2), Southern Nigeria (3), East Africa Protectorate (2), Negri Sembilan (2), Pahang.

**Local Authorities and Institutions.**—Among these were included :—

Stonyhurst College, International College Smyrna, Northern Lighthouse Board, Irish Lights Office, Clongoweswood College, Potsdam Observatory, Oundle School, Scarborough Corporation, Board of Trade Office Melbourne, Douglas Corporation, Stone Asylum, Edinburgh Academy, Dover Corporation, Colwyn Bay District Council, Lister Park Bradford, Bridlington Grammar School, Newquay District Council, Rhyl Urban Council, High Wycombe Grammar School, L.C.C. School Eltham, West Clare Railway Co., Armstrong College Newcastle, Meteorological Service Canada.

**Private Observers.**—Instruments have also been supplied on repayment to a number of private stations in connexion with the Office, viz.: H. Tudor Williams, Esq., Salisbury; A. Thom, Esq., Fortrose, N.B.; G. Rossiter, Esq., Teignmouth; Rev. H. H. Breton, Sheepstor; W. Tattersall, Esq., Sevenoaks; Rev. A. Doak, Carr Bridge, N.B.; Dr. W. H. Bryce, Fifeshire; Dr. A. Thomas, Aberystwyth.

**Telegraphic Reporting Stations.**—The instrumental equipment of the telegraphic reporting stations has been maintained.

**Storm Cones.**—Storm warning cones have been replaced at 17 stations and new cones supplied to Bridgwater and Blyth.

**Fishery Barometers.**—Inspectors of the Fishery Board for Scotland, the Department of Agriculture and Technical Instruction for Ireland, and of the Board of Agriculture and Fisheries in England and Wales have continued to examine and report upon the barometers supplied for the use of fishermen in their respective districts. The stations supplied with these barometers now number 226, of which 65 are in England, 6 in Wales, 60 in Ireland, 90 in Scotland, 4 in the Isle of Man, and 1 in Jersey. The fishery barometer at Valencia has been renewed and a barometer erected at Blyth Harbour.

## NORMAL METEOROLOGICAL OBSERVATORIES, ANEMOGRAPH AND SUNSHINE STATIONS.

**Observatories.**—The work of the three normal observatories of the office is reported upon separately, pp. 42–52.

The work of the normal observatories at Aberdeen and Falmouth has been carried on as usual. The Committee are indebted to Mr. G. A. Clarke, the observer at Aberdeen, for a number of interesting photographs and sketches of meteorological phenomena, including halos, aurora, and certain peculiar forms of cirrus cloud. More recently three photographs of the sky in natural colour by the Lumière process have been added, and they include a remarkable photograph of the colours shown by western clouds after sunset. These photographs and sketches form valuable additions to the Office Museum.

**Anemograph Stations.**—The number of anemograph stations which are maintained by the Office, or from which records are regularly received at the Office, is now 28. The autograph records are tabulated week by week, so that the information they contain may become available for public use without delay. Information from a selection of them is published monthly with the observations at stations of the second order (British Meteorological Year Book, Part III.), and an annual summary of gales is published as an appendix to the Weekly Report (Year Book, Part I.).

**Signalling Anemometer.**—Owing to the occasional derailment of trains on the West and South Clare Light Railway by high winds, a pressure tube anemometer has been lent to the Railway Company and placed in charge of the Stationmaster at Quilty station. An electrical attachment for the anemometer was devised in the Office, and made by Mr. Munro, to give a warning signal when the wind attains the danger limit of strength. When a wind velocity of 65 miles per hour is reached the first signal is made, so that ballast may be placed on the trains to increase their stability; but if the wind rises to a velocity of 85 miles per hour a second signal is given for the traffic to be stopped.

**Records of Sunshine.**—The number of stations from which returns of "bright" sunshine are received continues to increase, and at the close of the year amounted to 156. With three exceptions they are all situated in the British Isles, the exceptions being Georgetown, British Guiana; the Falkland Islands; and Chin-kiang, China. The original records from 122 stations are retained in the Office, whilst those from the remainder are sent to the Office monthly for examination and are then returned.

## OBSERVATORIES.

The scheme for the incorporation of the staffs of the Kew and Eskdalemuir observatories with that of the Meteorological Office in order to carry on the work of the observatories as a joint enterprise of the Office and the Royal Society, was brought into operation on the 1st July, 1910. The text of the scheme is as follows :—

### ARRANGEMENT BETWEEN THE METEOROLOGICAL OFFICE AND THE ROYAL SOCIETY FOR THE MANAGEMENT OF KEW OBSERVATORY.

Subject to the provisions of the Trust Deed of 1871, and of any Bye-laws made by the Royal Society under the Trust, the Gassiot Committee may, if they think fit, arrange with the Meteorological Committee for the Meteorological Office to make use of the accommodation at Kew Observatory and at Eskdalemuir upon the following conditions :—

1. The proceeds of the Gassiot Trust Fund, and the grant in aid made to the Royal Society for Eskdalemuir, shall be used in such manner as shall be approved by the Gassiot Committee for the maintenance of meteorological or magnetic observations, or other physical experiments at Kew Observatory, Eskdalemuir, or Valencia Observatory, in augmentation of the sum assigned for this purpose by the Meteorological Committee.

The Meteorological Committee, so far as is consistent with the terms of their Parliamentary Grant, shall promote the maintenance of such magnetic, seismological, or other meteorological or geophysical observations and researches at the aforesaid three observatories as may from time to time be recommended by the Gassiot Committee, in addition to the meteorological observations and researches initiated by the Director of the Meteorological Office for the purposes of the public Meteorological Service.

3. The staff and administration of the three observatories shall be under the control of the Director of the Meteorological Office, with the assistance of a Superintendent of Kew Observatory, a Superintendent of the Eskdalemuir Observatory, a Superintendent of Valencia Observatory. One of these Superintendents shall act as Assistant-Director of Observatories. The staff will be appointed by the Meteorological Committee and be subject to regulations laid down from time to time by the Committee, but the Assistant-Director and the Superintendents before mentioned will be nominated by the Gassiot Committee.

4. The Gassiot Committee shall hold at least one meeting between March 31 and June 30 to consider a report by the Director of the Meteorological Office, dealing with the work of the Observatories in the past financial year, and shall hold at least one meeting between September 30 and December 1, to consider a programme of work for the ensuing year. One of the meetings in each year shall be held at Kew Observatory.

5. The Gassiot Committee shall promote the scientific study of the branches of science to which the Trust relates, viz , Meteorology, Terrestrial Magnetism, Atmospheric Electricity, Seismology, and the cognate subjects. Opportunity shall be provided for the Gassiot Committee to consider any changes or additions that may be proposed as regards installations at the Observatories of apparatus of a permanent character, and also any proposals for international and co-operative researches extending over considerable periods of time. The Committee shall also be invited to consider from time to time the mode of reduction and of publication of the observations obtained at the Observatories, and to make recommendations with regard thereto. With respect to all questions submitted to the Gassiot Committee under this clause, they shall communicate directly with the Meteorological Committee through the Director of the Meteorological Office.

The list of members of the Gassiot Committee appointed by the Royal Society to administer the Gassiot Trust, and to act under the scheme as a scientific advisory committee for the work of the observatories, is printed on p. 5, and the staffs of the observatories now associated with that of the office are given on p. 8.

The Gassiot Committee have held four meetings to consider the work of the observatories, and have approved a number of reports dealing with the organisation of the observations of terrestrial magnetism and atmospheric electricity and the form of publication of the results. The form of the Meteorological Year Book has been modified in the manner already indicated (p. 17) to provide for the recommendations of the Gassiot Committee on these subjects. It is intended that the Geophysical Journal, together with the hourly tabulations of magnetic elements and summaries of geophysical results, shall form the nucleus of a collection of Discussions and Scientific Papers contributed by the various institutions within the administration of the Committee, for which a quarto volume is a convenient form of publication.

Reports by the Superintendents as to the work of the observatories are given separately.

The Meteorological Committee desire to acknowledge with thanks the presentation to Eskdalemuir Observatory of a pair of Galitzin seismographs for horizontal displacements by Professor Schuster which were installed under the personal supervision of Prince Boris Galitzin in July 1910. At the close of the Japan-British Exhibition in October 1910, Professor J. Milne, F.R.S., obtained from Mr. B. Mano, Japanese Commissioner and President of the Earthquake Committee of Japan, the promise of the loan, for two years, of a seismograph designed by Professor Omori and exhibited by the Japanese Government. He suggested that the instrument should be installed temporarily at Eskdalemuir in order that the working at the same station of instruments of the four different types: Milne, Wiechert, Galitzin, Omori, might be compared. Representation was accordingly made to the Royal Society, and the Gassiot Committee passed a resolution accepting the suggestion. Arrangements for installing the apparatus at the observatory are still under consideration.

The Committee also desire to acknowledge the presentation of a number of young trees for the observatory grounds by Mr. J. H. Milne-Home, Chamberlain to the Duke of Buccleuch.

A number of structural alterations have been carried out at Eskdalemuir Observatory for the purpose of increasing the accommodation in the superintendent's house, for improving the ventilation of the magnet house, for providing windows to view the pole star from the magnet huts, and for keeping the drifting rain water out of the houses and the huts.

The structural arrangements at Kew Observatory have been the cause of some anxiety. At the end of June and again in December the basement of the observatory was flooded. The congestion of work in the observatory prevented the Committee from taking the steps that seemed called for in order to meet the difficulty. It will not be possible to deal with the matter satisfactorily until the work of testing optical instruments is removed from Kew to Teddington. The Gassiot Committee have made a representation to the Executive Committee of the National Physical Laboratory who have in their turn applied to Government for funds to effect the removal of the testing work from Kew to Teddington. The Meteorological Committee are glad to learn that your Lordships have placed a sum upon the estimates for the current year for the extension of the buildings of the National Physical Laboratory, and they trust that they will be enabled to carry out the necessary structural alterations in the Observatory without delay. In the meantime the Office of Works have made some alterations in the sanitary arrangements of the basement of the Observatory which have relieved the Committee from the most pressing anxieties in that respect.

Until the transfer is carried out and the work of the observatory is dealt with exclusively by the observatory staff, it is difficult to form an opinion as to how the new scheme will work. At present it would appear that the work which the observatories have in hand is quite as much as they can accomplish. A recommendation by the Gassiot Committee, that the observatory at Eskdalemuir should become a fully equipped meteorological station of the first order, has been allowed to stand over on that account.

## CENTRAL OBSERVATORY—KEW OBSERVATORY, RICHMOND, SURREY.

*Report on the work of the Observatory from* 1*st January*, 1910, *to* 31*st March*, 1911, *drawn up by C. Chree, LL.D., Sc.D., Superintendent—Assistant Director of Observatories.*

Up to the end of June, 1910, Kew Observatory constituted as in previous years the Observatory Department of the National Physical Laboratory. On July 1st the management was transferred to the Meteorological Office, but the work of the verification of instruments has continued to be carried on for the National Physical Laboratory under the charge of the Superintendent of the Observatory pending the erection of suitable buildings at Teddington. Particulars of the verification work during 1910 and of the staff employed on behalf of the National Physical Laboratory will be found in the report of that institution.

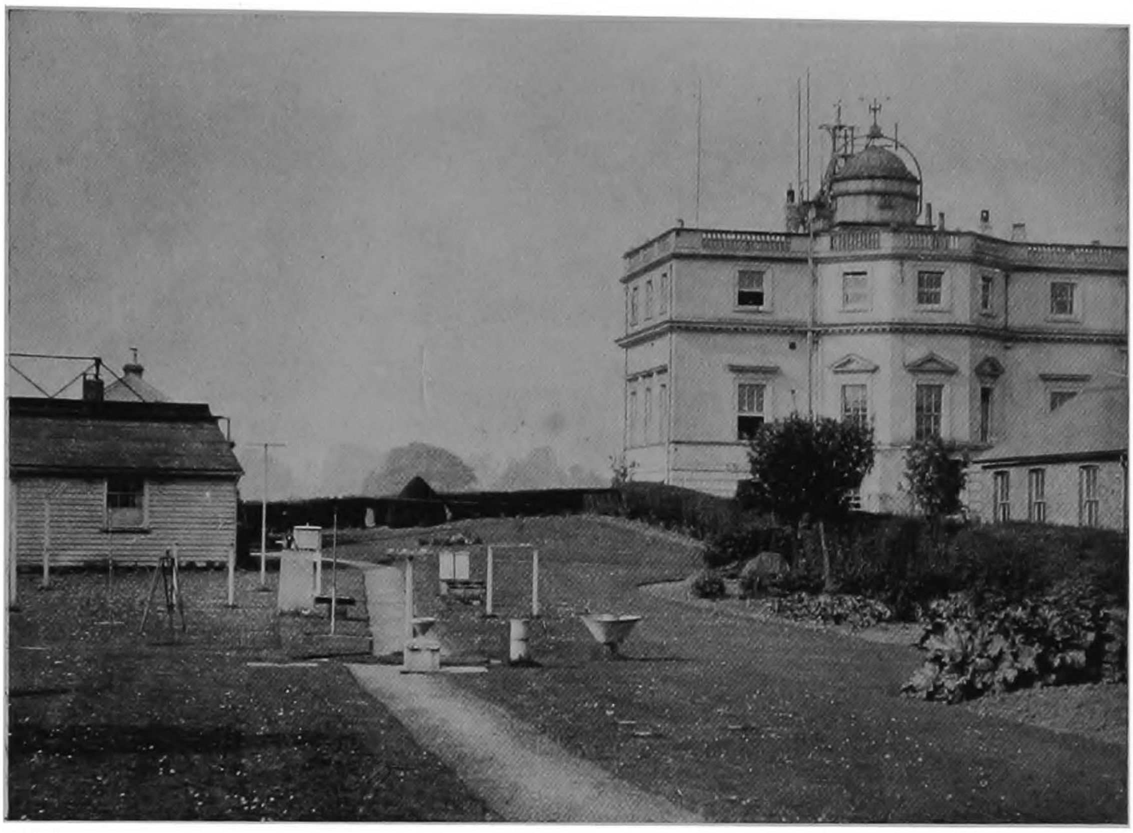
The names of the staff transferred to the Meteorological Office have been given on p. 8.

**Self-recording Instruments and Eye Observations.**—The instruments for obtaining the continuous records of magnetic declination, horizontal force and vertical force have been maintained in regular operation. Continuous records have been obtained of the meteorological elements, barometric pressure, temperature of the dry bulb and wet bulb, direction and velocity of the wind (by the Robinson standard anemograph and the Dines pressure tube), rainfall (by the Beckley gauge), and sunshine (by the Campbell-Stokes recorder). The Kelvin water-dropping electrograph, recording the atmospheric electric potential gradient, and the Milne seismograph, recording variations of level in the east-west direction, have also been maintained in continuous operation.

The continuous records have been supplemented by the usual eye readings and observations required to determine the scale values and the base line values of the curves.

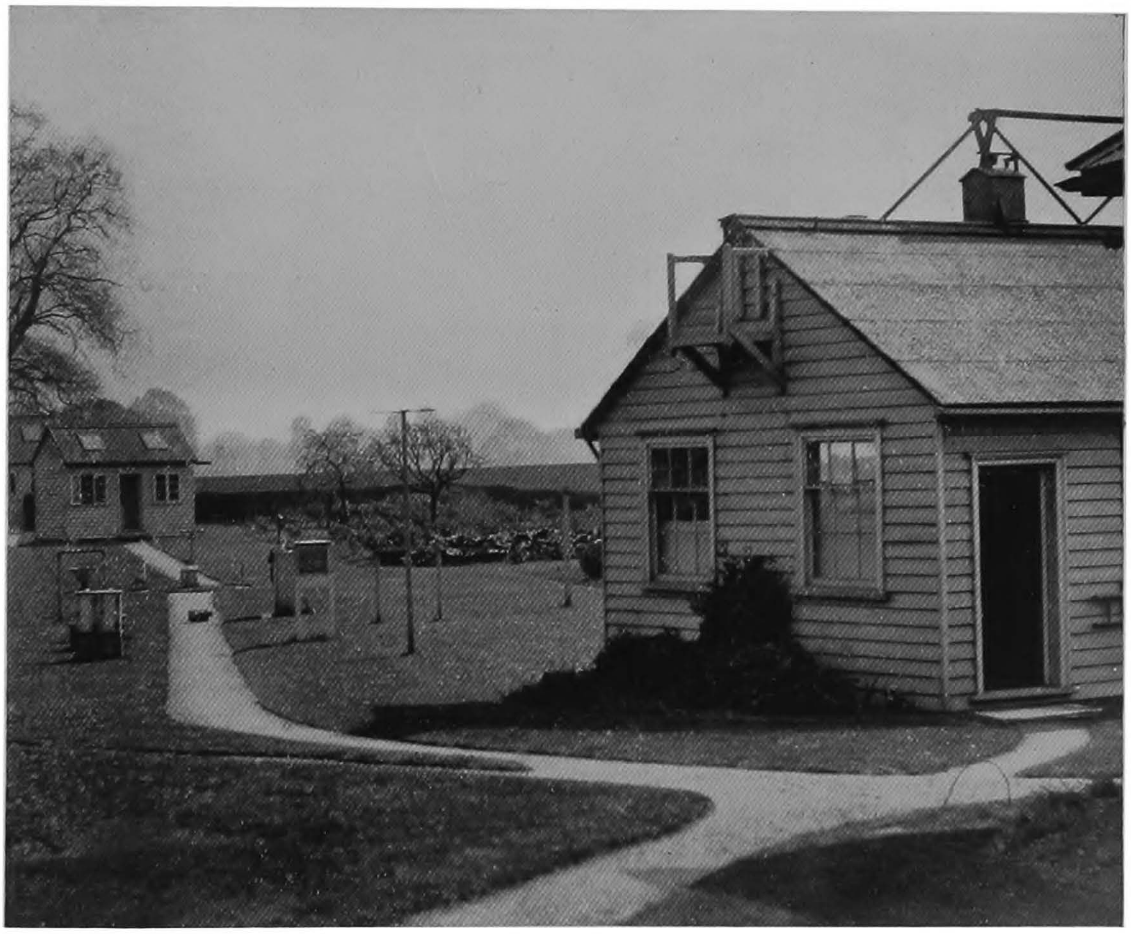
All the meteorological records obtained—except those from the pressure-tube anemometer—have been tabulated for each hour, and the results have been forwarded regularly to the Meteorological

FIG. 5.



KEW OBSERVATORY.—MAIN BUILDING AND METEOROLOGICAL INSTRUMENTS ON THE EXPOSURE LAWN.

FIG. 6.



KEW OBSERVATORY.—EXPERIMENTAL HUT, EXPOSURE LAWN, AND MAGNETIC HUT.

[*To face p.* 44.

Office. The electrograms have been measured at each hour on ten days a month, selected as representative of quiet day conditions, and since the commencement of 1911 they have been measured every day at four fixed hours. The declination and horizontal force magnetograms for 1910 have been measured at each hour on the five quiet days selected for each month by the Astronomer Royal; since the commencement of 1911, measurements have been made of the daily maxima and minima. The seismograms have been studied and measurements made of the amplitudes of all the principal movements.

Regular cloud observations have been made with the Fineman nephoscope and contributed to the international scheme of balloon ascents, for publication at Strassburg.

**Publication of the Results.**—Summaries of the results derived from the magnetograms, electrograms, and seismograms of the year 1910 are given in a separate publication in continuation of the Report of the Observatory Department of the National Physical Laboratory. This publication also contains mean monthly values of magnetic inclination and vertical force, based on the absolute observations, a list of recent values of the magnetic elements at the observatories whose publications are received at Kew, and a summary of mean monthly meteorological results, including data derived from the Ångström Pyrheliometer on days of bright sunshine within half an hour of noon.

The daily magnetic and electrical measurements initiated in 1911, with the results of solar and seismic records up to the end of March, have been prepared for the new Geophysical Journal.

In addition to the work represented by the tables of results published in the separate volume, the following experimental work has been conducted at the Observatory:—

**Fog and Mist.**—The observations of a series of distant objects, referred to in previous reports, have been continued. A table summarising the results is in preparation.

**Radio-integrators.**—Observations with the radio-integrators of the late Dr. W. E. Wilson's pattern went on until the end of 1910, when they were discontinued. A complete report on the results obtained since the experiments commenced in 1907 was prepared and submitted to the Meteorological Office.

The principal results derived from the investigation were as follows:—

The amount of liquid (normally alcohol) evaporated is widely different in different instruments, being largely dependent on the degree of exhaustion of the tube. Unless an absolutely uniform state of exhaustion is reached—which seems difficult to secure except for tubes on the pump together—the results obtained are not directly comparable. If, however, the exhaustions in two tubes though not identical are both good, the amounts evaporated in the two instruments stand to one another in a ratio which is approximately constant, varying only to a minor extent with the intensity of sunshine.

The amount evaporated is very sensibly dependent on indirect as well as on direct solar radiation, being frequently greater on a wholly sunless summer day than on a cloudless winter day.

By putting a glass shade over the instrument the amount evaporated was found to be nearly doubled, the effect occurring irrespective of whether the day was bright or cloudy, calm or windy.

On nights of active ground radiation the instrument was found to work backwards, alcohol which had been evaporated over into the collecting tube during the day, evaporating again and being returned to the exposed bulb.

To obtain a quantitative interpretation of the results further research is necessary, requiring the resources of a physical laboratory. It is much to be desired that investigations from the point of view of an experimental laboratory should be undertaken. The idea of Dr. Wilson's instrument is attractive, and it might be very useful for climatological purposes if it could be standardised.

**Pressure Tube Comparisons.**—The experiments by Mr. J. S. Dines, referred to in last year's report, were concluded, and some further results of a generally confirmatory character were obtained after Mr. Dines left the Observatory. A discussion of the earlier results by Mr. Dines and of the later results by the Superintendent was prepared and reported to the Meteorological Office and the National Physical Laboratory. The investigation related to the question of a difference between the standard heads now in use and the older patterns, but it is thought desirable, before issuing a report of the results, to make a comparison of the effects of the steady current of the wind channel of the National Physical Laboratory upon heads of the different patterns, and they have been sent to the Laboratory for the purpose.

**Hygrometrical Observations.**—Mr. J. S. Dines concluded his observations with hygrometers in closed rooms for the National Physical Laboratory, and his comparison of results from the Kew thermograph and from Assmann's ventilated hygrometer.

**Castle O'er barometric data.**—The late Mr. Bell of Castle O'er, Dumfriesshire, situated between Eskdalemuir Observatory and Langholm, shortly before his death handed over to Mr. G. W. Walker the records from a barograph which had been in constant operation at Castle O'er for a number of years. These were tabulated by the Kew staff, and the Superintendent has prepared a paper discussing the diurnal variation of barometric pressure at Castle O'er and comparing it with corresponding published results from Greenwich and all the first order stations of the Meteorological Office.

**Contributions to Scientific Journals, &c.**—A list of contributions to Scientific Journals, &c., is given on p. 19.

**Inspections.**—Mr. Baker and Mr. Constable have acted as in previous years as inspectors of several Meteorological Observatories and Anemograph Stations for the Meteorological Office. *See* Appendix VI.

**Library.**—The Library has received publications from 21 Scientific Societies and Institutions of Great Britain and Ireland, and 136 Colonial and Foreign Scientific Establishments. The card catalogue has been proceeded with.

**Commissions.**—Prepared photographic paper has been supplied to the Observatories at Hong Kong, Oxford (Radcliffe), Aberdeen, Eskdalemuir and Valencia, and in quarterly instalments to the India Office, for use in Indian Observatories. Sunshine cards and anemograph sheets have been sent to Hong Kong and sunshine cards to St. Petersburg.

**Completion of 50 Years' Service.**—In March, 1910, Mr. T. W. Baker completed fifty years of service at the Observatory, and a presentation was made him in recognition of the fact by Dr. Glazebrook on behalf of the staff of the National Physical Laboratory.

**Magnetic Instruction and Comparisons of Instruments.**—At the request of the India Office a course of magnetic instruction has been given to Commander Hickman, R.I.M.

Dr. Simpson and Mr. Wright, of the British Antarctic Expedition, spent some time at the Observatory familiarizing themselves with the Eschenhagen magnetographs to be employed in the Antarctic. A course of instruction in the taking of absolute observations was given to Mr. Wright.

In January, 1910, facilities were afforded to Professors Beattie and Morrison for a comparison of the magnetic instruments employed in their recent survey work in Africa. Similar facilities were afforded in March, 1910, to Mr. Pearson of the Carnegie Institution of Washington.

**Pendulum Observations.**—In February, 1910, facilities were afforded to Major Lenox Conyngham, of the Indian Survey Department, to make some special pendulum observations.

**Visitors.**—Parties of young naval officers from the Navigation School, H.M. Dockyard, Portsmouth, were shown over the Observatory on May 26th, 27th and November 17th, 18th.

A party of members of the Southern Counties Branch of the British Dental Association were shown over the Observatory on April 30th.

Amongst other visitors may be mentioned Mr. Stupart (Canadian Meteorological Service), Mr. Davis (Argentine Meteorological Service), Dr. Klotz (Ottawa), Prof. Tanakadate (Tokyo), Dr. W. Schmidt (Vienna) and Dr. Ullyanin (Kasan).

**International Magnetic Commission.**—The Superintendent attended the meeting of the International Commission for Terrestrial Magnetism and Atmospheric Electricity, held at Berlin in September, 1910, and was put on a sub-committee appointed to study the question as to the principles according to which the daily magnetic character should be determined. The report of the meeting will be included with that of the International Meteorological Committee now in preparation.

**Loan of Instruments.**—The following instruments, apparatus, &c., the property of the Meteorological Office, are at the present date out of the custody of the Superintendent on loan from the Observatory :—

| To whom Lent. | Articles. | Date of Loan. |
|---|---|---|
| The Science and Art Department, South Kensington. | Articles specified in the list given in the Annual Report for 1893. | 1876 |
| Lord Rayleigh ... | Standard Barometer (Adie, No. 655)... | 1885 |
| New Zealand Government. | Dip Circle, by Barrow, with one pair of needles and bar magnets, and a tripod stand. | 1899 |
| " " | Unifilar Magnetometer, by Jones, marked N. A. B. C. | 1909 |

## MAGNETIC OBSERVATORY.—ESKDALEMUIR OBSERVATORY, LANGHOLM, DUMFRIES-SHIRE.

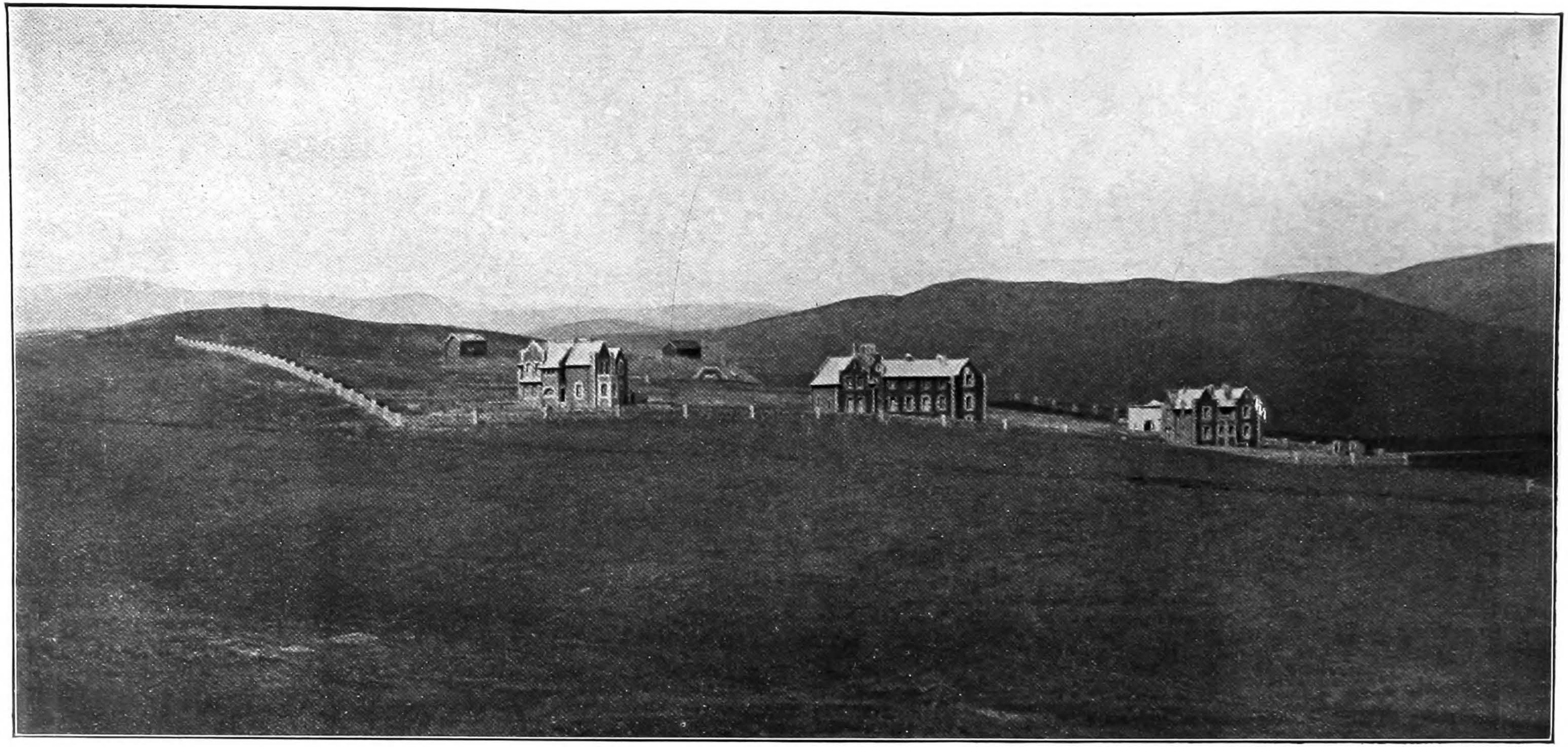
*Report on the work of the Observatory, from* 1*st January*, 1910, *to March*, 1911. *Drawn up by George W. Walker, M.A., Superintendent.*

On the 1st July, 1910, the administration of the Observatory was transferred from the National Physical Laboratory to the Meteorological Office, and the report is, in accordance with the requirements of the new administration, brought up to March, 1911.

**Observatory time.**—A time signal is received at 10h. daily except on Sundays and Post Office holidays. The time used is Greenwich mean time.

**Azimuth of Fixed Mark.**—A few observations of the sun were obtained during May and June. The results did not appear to me to be in very good agreement with each other or with the average obtained in 1909. Suspicion arose as to whether the unifilar was capable of giving the required accuracy and whether error was introduced by unequal heating of the instrument and pier during an observation. Further, it was unfortunate that observations could only be made for about six or seven weeks when the altitude of the sun was sufficient to obtain an observation through the roof light. Accordingly I suggested that a roof light should be made for observing the Pole Star, which would be available at any time of the year, and that a theodolite of much greater capability than the unifilar magnetometer should be used. These suggestions were approved and the window was completed in February, 1911. A number of observations have been secured, and, so far, these indicate that there is no very serious error in the values for 1909. A careful examination of possible instrumental errors will be made during the year, and for the present the former value for the azimuth will be retained, viz., azimuth of mark from pier of East hut = $8^\circ\ 12'\cdot5$ W. of S.

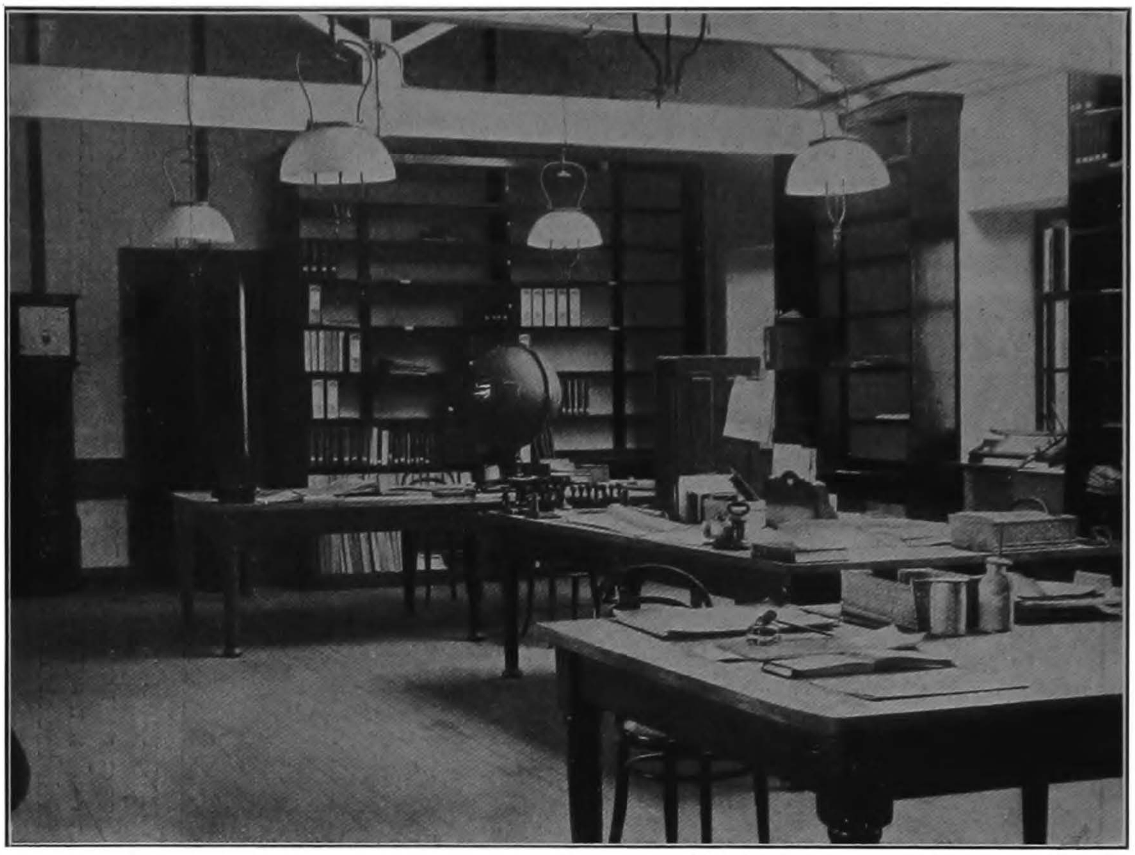
FIG. 7.



ESKDALEMUIR OBSERVATORY.—GENERAL VIEW FROM THE SOUTH-WEST.

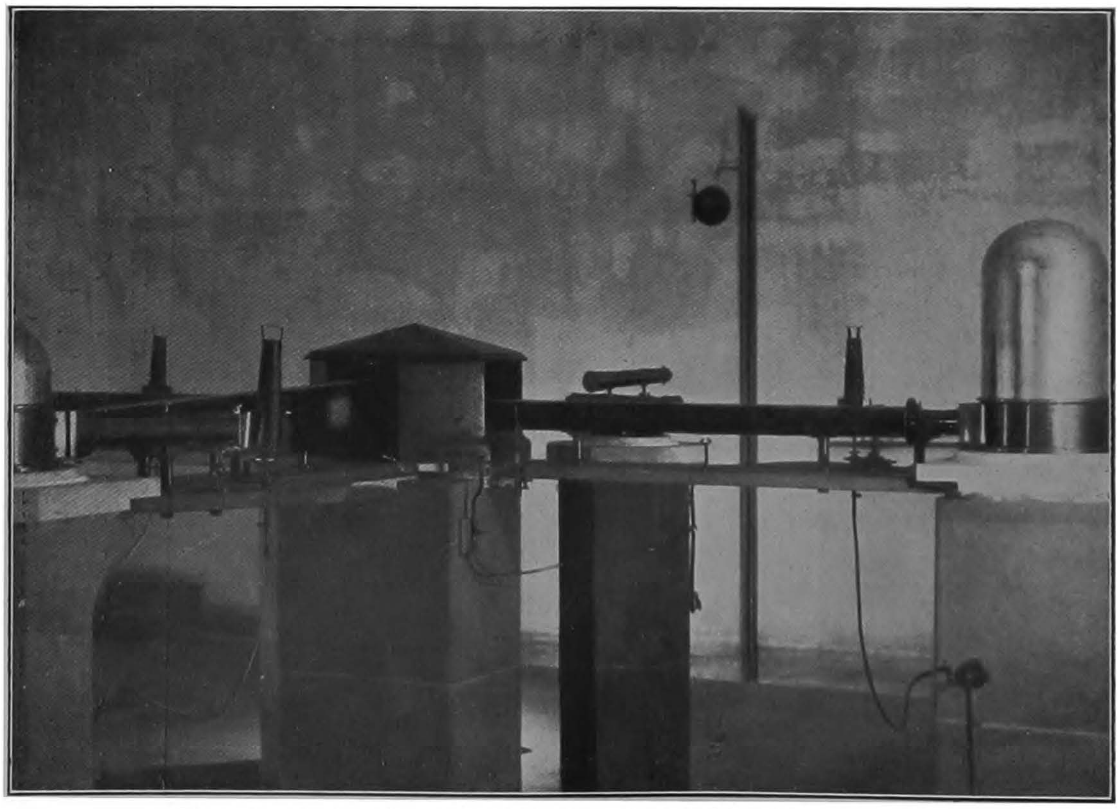
The Office Block is the middle one of the three buildings in line; the Superintendent's house is on the left, the Caretaker's house with Assistants' quarters on the right. The two huts in the background are the wooden magnetic huts for "absolute" observations. In front of the right-hand hut is seen the mound of the underground magnetic chamber, with the stonework of the top of the porch.

FIG. 8.



ESKDALEMUIR OBSERVATORY.—OFFICE AND COMPUTING ROOM.

FIG. 9.



ESKDALEMUIR OBSERVATORY.—ADIE MAGNETOGRAPH.

The observational work may be dealt with under the following heads :—

I. Magnetic Observations.
II. Meteorological Observations.
III. Seismology.
IV. Other Observational and Experimental Work.
V. Miscellaneous.

**I. Magnetic Observations.**—Absolute observations of Horizontal Force, Declination and Inclination have been made in the East hut during the year.

Numerous experiments were made with a view to ascertaining the best procedure in the deflexion experiment, and as a result of these it has been decided to use distances 25, 30, 35 cms. and to complete observations at one distance before proceeding to the next. Curve correction is applied for any change in the interval.

Tables of mean monthly values for the year 1910 are given in the volume issued by the Meterological Committee in continuation of the Annual Report of the Observatory Department of the National Physical Laboratory.

It is gratifying to be able to say that the underground magnet house has been occupied during the whole period covered by this report. The place still requires most careful watching, but we can say that the question of dampness has been reduced to a manageable state.

In accordance with the recommendation of the Gassiot Committee, it was decided to make the Adie magnetographs record geographical components of force. The former H magnet now records the north component, while the former declination magnet was fitted with a bifilar suspension and now records the west component. Their behaviour in these positions has been very satisfactory. There was initially a certain amount of drifting in the west component magnet, but this has now disappeared.

The behaviour of the Vertical Force magnet has not been satisfactory. It was somewhat unfortunate that the Eschenhagen recorders, which we had on loan from the Admiralty, were requisitioned in February for Capt. Scott's antarctic expedition. Their removal put an end to any experiments in compensating the magnet for temperature change. A more serious matter however is the fact that a slight mechanical shock, such as occurs in the course of necessary attention to the instruments, generally produces a slight dislocation of the zero. The effect is characteristic of all balances suspended on a knife edge, and the best course appears to be to suspend the magnet by quartz fibres so that it has a true mechanical zero. An experimental model made in the workshop gives promise of success, and it is hoped that a carefully constructed instrument on this principle will be obtained this year.

Experimental models with bifilar quartz suspensions for recording horizontal components are also being made, with a view to making a new set of recorders for magnetic storms.

**II. Meteorological Observations.**—During 1910 the control observations of temperature, pressure, weather, etc., were made at 10, 16 and 22 hours. Monthly returns of these were made to the Meteorological Office and have been published in the Meteorological Year Book. On the 1st January, 1911, the observation hours were changed to 9, 15 and 21 hours. With the exception of the photographic thermograph, the recording instruments have been running continuously and tabulation of hourly values carried on. It was found that at certain parts of the thermometer scale, the optical definition was very poor, and accordingly new thermometers were introduced in July. The adjustment and testing of these necessarily interrupted continuous registration for a few weeks.

From the results obtained in 1909 it was clear that the protecting dykes for the rain gauges were too high. It was therefore decided to lower the dyke surrounding the Beckley recorder until it was level with the rim of the gauge. The three gauges were also adjusted so that in each case the rim stands 1 foot above the ground. The dyke round the protected check gauge will be reduced as soon as one year's comparative results have been obtained.

**III. Seismology.**—The Milne instrument has continued in action. The Wiechert seismograph was run for some time, but as the results obtained were not satisfactory, its use has been suspended for the present, but its action will probably be re-examined in the near future.

Dr. Arthur Schuster, F.R.S., presented to the observatory a pair of Prince Galitzin's horizontal seismographs. In these the pendulum is made dead-beat and electromagnetic registration of the movement is made.

Prince Galitzin visited the observatory in the beginning of July, 1910, in order to superintend the installation of the instruments, and they are now in regular use. They form a most valuable addition to the seismological equipment of the observatory, as they enable one to locate an epicentre, without any data obtained from other stations. An interesting feature is the behaviour of both the Milne and Galitzin seismographs when the wind rises to about 30 miles an hour. Both instruments are disturbed, the Milne instrument showing the well-known air tremors. While these are difficult to distinguish from true small earthquakes, there is no difficulty in distinguishing which is which on the Galitzin records. The record of a small earthquake is totally different from the record of wind disturbance.

A record of all disturbances has been sent as before to Dr. Milne. It may not be out of place to mention here that Dr. Milne visited the observatory when Prince Galitzin was here. He has taken a great interest in our work and has presented a number of works on seismology to our library.

**IV. Other Observational and Experimental Work. Atmospheric Electricity.**—Ebert's ionisation apparatus has been used whenever occasion could be secured.

It would be of great advantage if the time required for an observation could be considerably reduced and if the apparatus were made more sensitive.

The electrograph has been running continuously since July, 1910, and the sulphur insulation referred to last year has been very satisfactory. The natural time constant was measured frequently at the same time as an observation of air conductivity was made with Ebert's apparatus, and the evidence is fairly clear that the natural time constant increases as the conductivity of the air diminishes, thus indicating that any leakage from the system is mainly due to natural ionisation of the air. The lowest value obtained when every care had been taken to see that no spiders were present, was 40 minutes, while the largest value was no less than 155 minutes. It was thought desirable to increase the efficiency of the water sprayer by doubling the jet. This arrangement has been satisfactory and gives a time constant of 36 seconds. It will thus be seen that the greatest error in potential on account of leakage has been just over 1 per cent., but the usual value is about ½ per cent. Spiders have occasionally given trouble.

The zinc-copper voltmeter referred to last year was run along with the Dolezalek electrometer for some time, and the records were precisely similar. Owing to mechanical imperfection of the quadrants it proved very difficult to get uniformity of scale value above + or − 500 volts. A new set of quadrants and a Dolezalek needle have just been obtained and the instrument is now under test. If it proves successful it will be run along with the electrograph so as to give the very high potentials which are frequently beyond the present range of the Dolezalek electrometer.

In order to obtain the potential gradient in the open, a circular space 15 feet radius was levelled at a considerable distance from the buildings. In the centre of this a pit was dug capable of containing a stone pier with a high potential Wulf electrometer and the observer. When in use a metal lid closes flat over the observer and an aluminium rod rises from the electrometer and passes vertically through a small hole in the lid to a height of 1 metre. Observations are usually made with the fuse burning at a height of 100 cms. and 50 cms. independently. This arrangement eliminates entirely error due to presence of electrometer pier and observer, while the error due to air conductivity has been less than 1 per cent. as shown by observation of the time constants.

**Solar Radiation.**—Ångström's Pyrheliometer has been used. It appears to be a somewhat rare event here to get suitable conditions between the international hours of 11h and 13h. But as in 1909 I have not been able to take advantage of every opportunity that occurred.

**V. Miscellaneous.—Library.**—The library has increased considerably, thanks to reports from various observatories throughout the world. We take this opportunity of thanking all who have in this way assisted, and would especially mention a most valuable contribution of past volumes of the "Philosophical Transactions" from the President and Council of the Royal Society.

**Tabulation of Results.**—Systematic tabulation of all results commenced on 1st January, 1911, with a view to continuous publication as from that day.

### WESTERN OBSERVATORY.—VALENCIA OBSERVATORY, CAHIRCIVEEN, CO. KERRY.

The self-recording meteorological apparatus of a first-order station has been kept in continuous operation throughout the year, and the hourly tabulations are being published in Part IV. of the British Meteorological Year Book as usual.

The magnetic observations, in co-operation with the magnetic work of the National Physical Laboratory, under an arrangement with a committee of trustees, of which the late Earl of Rosse was the principal, have been continued.

### INVESTIGATION OF THE UPPER AIR.

The general scheme of operations at Pyrton Hill under the direction of Mr. W. H. Dines, F.R.S., has remained unchanged during the year.

**International Co-operation.**—The dates fixed by the International Commission for Scientific Aeronautics as days of international co-operation in 1910 were :—January 6 ; February 2, 3, 4 ; March 3 ; April 14 ; May 11, 12, 13 ; June 2 ; July 7 ; August 8–13 ; September 1 ; October 6 ; November 2–4 ; December 1.

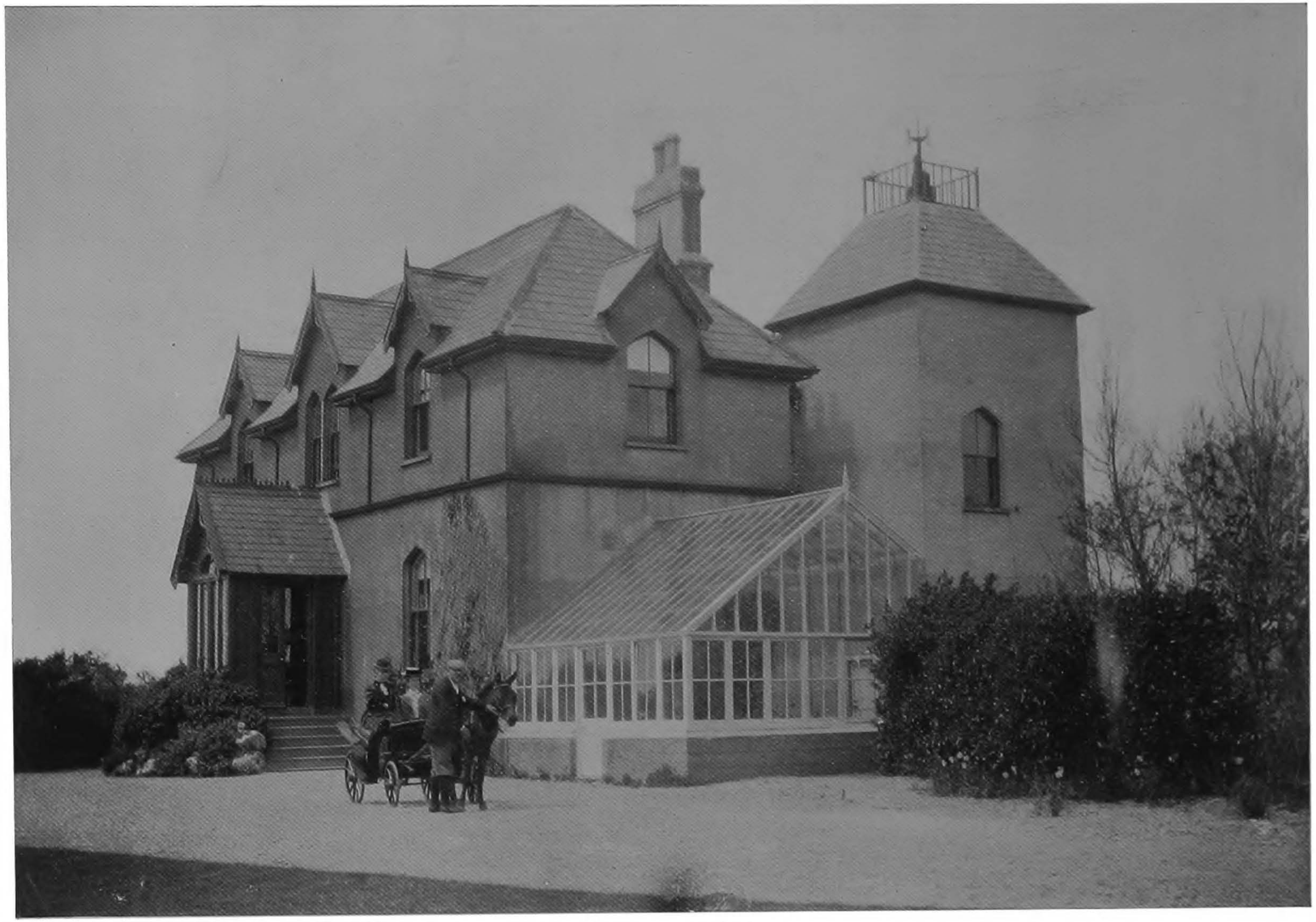
The dates in August constituted the special international week for which the Office arranged to conduct observations at Crinan, Argyllshire, as well as at Pyrton Hill, while the Joint Committee of the Royal Meteorological Society and the British Association for the Advancement of Science made arrangements for observations to be made at Oughterard, Co. Galway, by Captain C. H. Ley, late R.E. Registering balloons were liberated at Manchester on the international days, and a second series of ascents of 25 balloons at intervals of an hour was carried out there on March 18, 19. Observations were also continued by Mr. C. J. P. Cave at Ditcham Park, Petersfield, and by Mr. S. H. R. Salmon at Brighton, who co-operated in the international scheme throughout the year. Special observations of clouds on the days of international ascents and the days preceding were made at the observatories of Greenwich, Kew, Aberdeen, and Valencia.

By special request of the International Commission, observations were also made on May 18–20, the days when Halley's Comet was in perihelion, in order to obtain a record of the meteorological conditions then prevailing. The records did not differ so markedly from those usually obtained as to suggest that the comet had any influence on the temperature of the upper air. Special observations of atmospheric electricity and of the number of dust particles in the atmosphere during the passage of the comet were made by Mr. J. Aitken, F.R.S., of Falkirk (Proc. R. S. E. vol. 30, p. 529, 1910).

The observations of the upper air for the Meteorological Office are partly by means of kites and partly by balloons carrying self-recording instruments, partly also by pilot balloons which are observed from below.

**Kite and Balloon Ascents at Pyrton Hill and Crinan.**—At Pyrton Hill kites carrying recording apparatus have been sent up regularly throughout the year. A new boiler for the engine controlling the kite winding gear has been fitted.

FIG. 10.



VALENCIA OBSERVATORY.—GENERAL VIEW.

[*To face p.* 52.

Thirty-two balloons carrying instruments recording temperature and height were sent up from Pyrton Hill in 1910. Each balloon carried a card offering a reward of 5*s.* to the finder upon receipt of the instrument undamaged. In 23 cases out of the 32 the instrument was found and the reward claimed. Eight balloons were liberated from Crinan and six instruments were returned. Three instruments only failed to reach the stratosphere.

The experiment has been tried of sending up larger balloons with a view to attaining to greater heights, but without much success, possibly on account of the quality of the rubber used.

A systematic attempt has been made to ascertain the effect of solar radiation upon the instruments, or temperature of the upper air, by sending up on several occasions an additional balloon after sunset, on the evening of the day preceding the international day. The result, so far as it goes, shows that distinctly higher temperatures are recorded while the sun is shining.

**Publication and Discussion of Results.**—The results of all the kite and balloon ascents are published in the British Meteorological Year Book, Part I. (Weekly Weather Report). Observations made on the days appointed by the International Commission were forwarded to Professor Hergesell, of Strassburg, for publication also in international form along with the results obtained simultaneously in other countries.

The contribution to the publication of the results at Strassburg by international arrangement has been continued. The latest issue of the publication received before the close of the financial year, 31st March, 1911, was that for April, 1909. It is understood that the delay in the publication is due to the fact that the funds contributed by the countries which subscribe to meet the cost are not now sufficient to keep the printing of the observations up to date. The work has been largely extended without any corresponding increase of funds. Efforts are accordingly being made to induce other countries interested in the work to participate in the expense of publication of the results.

Models of the wind conditions in the free air above an observing station, as determined by observations of balloons by means of theodolites, have been constructed by placing vanes at regular intervals along vertical standards, each vane representing by its direction the direction of the wind, and by its length the velocity of the wind in each 500 metres layer above sea-level. The models are on view in the museum of the Office.

Nearly all the recording instruments for use at the co-operating stations of the British Isles during the year were made at Pyrton Hill. Instruments have also been supplied for the Canadian Meteorological Service, and for Professor Assmann, Lindenberg.

## CORRESPONDENCE AND ACCOUNTS.

Appendix I., p. 55, shows the receipts and payments during the year ended 31st March, 1911. The amount voted by Parliament was £16,750, and the miscellaneous receipts amounted to £5,763 3*s.* 11*d.*

The following abstract shows approximately the net payments of this and the preceding year, together with the increase or decrease in 1910–11, as compared with the previous year:—

| NET EXPENDITURE. | 1909–10. | 1910–11. | Increase. | Decrease. |
|---|---|---|---|---|
| | £ | £ | £ | £ |
| GENERAL ADMINISTRATION: | | | | |
| *Director* ... ... ... | 1,000 | 1,000 | — | — |
| *Office Salaries* ... ... | 6,996 | 7,592 | 596 | — |
| *Rent, Fuel, and Lighting*... | 727 | 697 | — | 30 |
| *Alterations to premises and contingencies* ... ... | — | 576 | 576 | — |
| *Postage* ... ... ... | 588 | 635 | 47 | — |
| TELEGRAMS, &c. ... ... | 1,615 | 1,830 | 215 | — |
| TRAVELLING EXPENSES ... | 341 | 328 | — | 13 |
| INSTRUMENTS ... ... | 531 | 376 | — | 155 |
| OBSERVATORIES:— | | | | |
| *Kew* ... ... ... | 3,174 | 555 | 247 | — |
| *Eskdalemuir* ... ... | | 51 | | |
| *Valencia* ... ... ... | | 457 | | |
| *Allowances to other Observatories, Observers, &c.* | | 2,358 | | |
| SUPERANNUATION ACCOUNT | 1,092 | 1,060 | — | 32 |
| Total ... ... £ | 16,064 | 17,515 | 1,681 | 230 |

The following notes explain the chief causes of variation in the year 1910–11.

The increase under Office Salaries is due to the appointment of a Superintendent of the Forecast Division from October 1st, 1910, and partly to the investment during the year of a sum of £200, reserved from salaries, for the provision of retiring allowances.

The decrease under Rent, Fuel and Lighting is due to a smaller expenditure for coals and light consequent on the change of Office.

The charge under Alterations to Premises and Contingencies is due to the removal of the Office, and includes £120 for dilapidations on the termination of the tenancy of 63, Victoria Street. The total capital expenditure in connexion with the removal will be approximately £1,000.

The increase under Postage is partly due to an increased demand for the Daily Weather Report; the number of subscribers on 31st March, 1911, was 24 in excess of that on 31st March, 1910.

The increase under Telegrams, &c., is to be explained partly by the institution of daily telegraphic reports from Madeira, and partly by a large increase in the number of occasions for the issue of Storm Warnings during the year.

Against the decrease under Instruments is to be set a reduction of £40 in the value of the Meteorological Office stock at the end of the year.

The increase under Observatories is due mainly to the transfer of the Kew and Eskdalemuir Observatories to the care of the Committee, and was provided for by an increase of the Parliamentary grant.

W. N. SHAW.
Chairman.

July 5, 1911.

# APPENDICES.

## APPENDIX I.

ACCOUNT of RECEIPTS and PAYMENTS for the year ended 31st March, 1911 :—

| RECEIPTS. | £ s. d. | £ s. d. | PAYMENTS. | £ s. d. | £ s. d. |
|---|---|---|---|---|---|
| Balance from year 1909-10 | — | 2,206 14 8 | Director | — | 1,000 0 0 |
| Parliamentary vote | — | 16,750 0 0 | OFFICE SALARIES: | | |
| M.O. OBSERVATORIES : | | | Clerical Staff, monthly (uninsured) | 2,865 5 0 | |
| Kew | 529 16 4 | | Clerical Staff, monthly (insured) | 4,532 0 5 | |
| Eskdalemuir | 758 0 0 | | Clerical Staff, weekly | 269 18 11 | |
| Valencia | 17 10 0 | 1,305 6 4 | Messengers, " | 372 7 2 | 8,039 11 6 |
| DEPARTMENTAL EXPENSES REPAID: | | | M.O. OBSERVATORIES: | | |
| Forecasts, &c. | 215 4 0 | | Kew | 1,085 2 2 | |
| Marine, Statistics, and Observatories | 92 10 3 | | Eskdalemuir | 808 18 5 | |
| Instruments | 139 7 9 | 447 2 0 | Valencia | 474 8 6 | 2,368 9 1 |
| INCIDENTAL EXPENSES REPAID: | | | OFFICE EXPENSES: | | |
| Forecasts, &c. | 375 15 8 | | Rent, Fuel, &c. | 817 2 8 | |
| Other Branches | 78 15 3 | | Furniture, Fittings, &c. | 421 15 5 | |
| Stationery Office Account | 47 7 7 | 501 18 6 | Incidental | 456 19 3 | 1,695 17 4 |
| TELEGRAPH CHARGES REPAID: | | | POSTAGE AND TELEGRAMS: | | |
| Home | 158 13 10 | | General Postage | 291 17 6 | |
| Telegrams sent abroad | 349 13 9 | 508 7 7 | Postage of Daily Weather Reports | 343 11 10 | |
| INSTRUMENTS: | | | Telegrams, &c. | 2,338 1 4 | 2,973 10 8 |
| Royal Navy | 506 4 6 | | TRAVELLING EXPENSES AND INSPECTIONS | — | 327 14 5 |
| Mercantile Marine, Stations, &c. | 1,489 10 5 | 1,995 14 11 | SUPERANNUATION | — | 1,691 0 0 |
| OBSERVATORY FORMS, &C. | — | 48 2 6 | COSTS OF INSTRUMENTS: | | |
| SUPERANNUATION ACCOUNT: | | | Royal Navy | 506 4 6 | |
| Annuities | 565 0 0 | | Mercantile Marine, Stations, &c. | 1,865 18 0 | 2,372 2 6 |
| Interest on Investment | 66 5 7 | 631 5 7 | AUXILIARY OBSERVATORIES, &C. | — | 2,484 8 7 |
| LECTURES AND EXPERIMENTS | — | 325 5 8 | LECTURES AND EXPERIMENTS | — | 458 3 1 |
| Amount refunded | — | 10 | Antarctic Meteorology | — | 10 5 2 |
| | | | BALANCE: | | |
| | | | Cash at Bank | 1,270 0 4 | |
| | | | " at Office | 28 15 11 | 1,298 16 3 |
| | | £24,719 18 7 | | | £24,719 18 7 |

*Note.*—On 31st March, 1911, the amount of 2½ per cent. Annuities held for the provision of Superannuation Annuities was £3,603 2*s.* 1*d.*

# APPENDIX II.

## STATEMENT OF PROVISIONS FOR THE SUPPLY OF INFORMATION TO THE PUBLIC, 1911–12.

### THE METEOROLOGICAL OFFICE.

The office was established in 1854 as a department of the Board of Trade. From 1866 to 1877, with a Parliamentary Grant in Aid, it was under the management of a Committee, and from 1877 to 1905 under a Council appointed by the Royal Society. It is now under the control of a Director and Committee appointed by H.M. Treasury.

Kew Observatory and the Eskdalemuir Magnetic Observatory were transferred from the National Physical Laboratory, July 1, 1910, with subventions from the Royal Society. The Gassiot Committee appointed by the Royal Society consisting of the officers of the Society and eleven other members acts as an Advisory Committee for the work at the Observatories.

*Director :*
WILLIAM NAPIER SHAW, LL.D., Sc.D., F.R.S.

*Marine Superintendent :*
Commander M. W. CAMPBELL HEPWORTH, C.B., R.D., R.N.R.

*Superintendent of Forecast Division :*
R. G. K. LEMPFERT, M.A.

*Superintendent of Statistics :*
E. GOLD, M.A.

*Superintendent of Instruments :*
R. H. CURTIS.

*Chief Clerk and Cashier :*
JOHN A. CURTIS.

### OFFICE PREMISES.

Exhibition Road, South Kensington.
Telegraphic address—" Weather, London."

**Office hours and general arrangements.**—The Office is open for general inquiries between the hours of 10 a.m. and 4 p.m. on week days (Saturdays, 1 p.m.), and for inquiries for forecasts and for information concerning the present weather conditions (*see* Section

B, Telegraphic Information) from 8.30 a.m. to 8 p.m. on week days, and from 6 p.m. to 8 p.m. on Sundays.

All communications should be addressed to the Director.

Cheques, &c., should be crossed "Bank of England, Western Branch," and be made payable to the "Meteorological Committee."

**Supply of Information and Charges.**—The books and documents in the Office library, and the manuscript returns in the possession of the Office, may be consulted or copied at the Office, free of charge, by any person, by permission of the Director. Extracts from them are supplied to any person making written application to the Director specifying precisely the details of the information required. For these extracts a charge is made to cover the cost of the time required for selecting and making them. The usual minimum charge is 5*s*. There are certain special exceptions with a smaller charge; a schedule of these will be sent on application.

The extracts will, if required, be attested by a sworn declaration before a Commissioner for Oaths, at a fee of £1 1*s*. (in addition to the charge of 1*s*. 6*d*. made by the Commissioner for Oaths). A special fee of from £2 2*s*. for each day's attendance is charged if a representative is required to attend in court in London with reference to the statements contained in the extracts supplied.

The facilities for the supply of information have been classified under the following heads:—

A. Marine Information.
B. Telegraphic Information.
    Daily Weather Reports, Forecasts and Storm Warnings.
C. Statistical Information.
    The British Meteorological Year Book—
        Part I., Weekly Weather Report.
        Part II., Monthly Weather Report.
        Part III., Observations at Stations of the Second Order and at Anemograph Stations.
        Part IV., Hourly Readings from the Self-Recording Instruments at Four Observatories.
    Unpublished Observations.
D. Information from land stations outside the British Isles.
E. The Library.
F. Supply of Instruments and Forms to Observers.
    Fishery Barometers.
G. Publication of Observations contributed by Volunteer Observers or by the Representatives of Local Authorities.
H. Regulations for the Supply of Information from Instruments belonging to the Meteorological Office by the Custodians of the Instruments.
I. Observatories and Stations in connexion with the Meteorological Office.
K. List of Publications.

## A.—MARINE INFORMATION.

**General Information.**—Observations have been forwarded to the Office, in special log books and registers, since 1855, by officers of the Royal Navy and the Mercantile Marine, and this valuable co-operation continues. In addition a large number of logs and remark books kept on board H.M. ships have been lent to the Office by the Admiralty, and by the large shipping firms, from time to time, for the purpose of extracting meteorological data. The information thus received is dealt with in various ways, and the results, which are published for the benefit of seamen and others, are indicated on pp. 109–111. Copies of these publications are presented from time to time to officers who contribute regular returns.

Information is given to seamen, upon application to the Meteorological Office, either in person or by letter, with respect to the meteorological conditions likely to prevail along a proposed route, either for sailing vessels or for steamships.

**Monthly Charts.**—Meteorological Charts of the North Atlantic and Mediterranean have appeared each month since 1901, and a similar monthly series for the Indian Ocean and Red Sea since May, 1906. In May, 1910, this series was extended southward, so as to include all parts of the ocean as far south as the parallel of 35° S. Commencing with the issue of May, 1911, it will be extended eastward to the 125th meridian of east longitude; and its scale will be reduced.

The temperature of the sea surface will be differentiated by grades of colouring in blue; and isobars and isotherms will be shown on the face of the chart, instead of by means of an inset chart. Magnetic variation curves for 1912 will be substituted for those at present shown on the chart. On the face of these charts there are graphically represented, for the respective ocean areas, the normal winds, currents, distribution of atmospheric pressure, and temperature of air and sea surface, the magnetic variation, and the best routes for sailing vessels and steamships, according to the season. On the North Atlantic charts, in addition, there are given the average limits of trade winds, gales, fog, and ice, mean paths of centres of cyclones, storm signals, and radio-telegraphy stations; time of high water at Dover; recent reports of ice, including, in the months of April, May, June, November and December, the latest intelligence, by cablegram, from the Signal Service of Canada, in regard to the state of the ice in the Gulf of St. Lawrence and its approaches. A weekly edition of this series has been issued since 14th April. On the Indian Ocean charts there are given the average limits of trade winds and monsoons, surface temperature and currents near Cape Guardafui; information relative to the meteorology of the Red Sea, and tracks of cyclones in the Bay of Bengal, the Arabian Sea, and the South Indian Ocean. During the south-west monsoon season, important cable

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**Daily Synoptic Charts of the N. Atlantic. Weekly Charts of Sea Surface Temperature.**—Since April, 1910, the charts of the North Atlantic and Mediterranean have been issued in weekly instalments. This arrangement affords an opportunity of including on the backs of the charts seven maps giving the distribution of pressure and other elements on each day of the week ended on the day before the issue of the chart, over Europe, the North Atlantic, and the East of America. The charts are prepared from reports received from land stations in Europe in connexion with the telegraphic work of the Office, from reports from ships of His Majesty's navy and the mercantile marine received by wireless telegraphy, and from the information for American stations published in the Bulletin International, issued by the Bureau Central Météorologique in Paris. Five charts are also shown giving for successive periods of seven days the most recent information regarding the temperature of the sea surface water in the North Atlantic. The most recent information as to the occurrence of ice both in the Gulf of St. Lawrence and in the open ocean, and as to derelicts, is also included.

**Special Articles.**—The special features of the current issue of the Meteorological Charts of the North Atlantic and Mediterranean, include monthly inset charts showing the percentages of fog, mist, and gales over the North Atlantic for each month ; the latest information to hand up to the time of going to press each month with respect to ice in the Southern Ocean ; fog, mist, and ice, conditions of the Baltic and the North Sea ; Arctic weather of 1910 ; phenomenal drifts and numbers of derelict ships in the Bay of Biscay, and similar information for the Gulf of Mexico ; October hurricanes and their effect on shipping ; observations of atmospheric pressure, temperature, and humidity, by self-recording instruments on board H.M.S. *Defence*, Captain C. F. Dampier, R.N. ; and lists of submarine and radio-telegraphy stations on either side of the North Atlantic.

On the backs of the Meteorological Charts of the Indian Ocean and Red Sea information has been given relative to various subjects which are of importance to navigators and others. Among the items dealt with, in some instances illustrated by diagrams, are the following :—Comprehensive accounts of icebergs and field ice in the Southern Hemisphere ; cyclonic storms of the Indian Ocean for a series of years ; Indian Ocean storm signals ; co-tidal lines of the North Indian Ocean ; phosphorescent displays in the several oceans ; a monthly statement of currents experienced by the S.S. *Peninsular* during several years on passages between Bombay and Aden. Other articles relate to calms and variable winds of the Bismarck Archipelago, 1909 ; typhoons of the North Pacific, 1909 ; Cocos Islands [illegible]ne, November, 1909 ; Fiji hurricane, March, 1910 ; Mozambique hurricane, March, 1910 ; South Indian Ocean cyclones, December, 1910 ; and severe gales of the Southern Ocean, 1910.

**Terms of Subscription.**—Copies of both series of charts may be obtained from the Superintendents of the Mercantile Marine Offices at the principal ports of the United Kingdom, by captains and officers of merchant ships, price 6*d.* each. They may also be purchased from the Admiralty agents for the sale of charts, and from the agents for His Majesty's Stationery Office at Edinburgh, and at Dublin, at the rate of 5*s.* for an annual series of 12 charts, or 6*d.* for each chart, in addition to the cost of transmission. The Indian Ocean Charts are also obtainable on similar or equivalent terms from Messrs. James Murray and Company, at Calcutta, and at the shipping offices at Bombay and Madras. Captains and officers who co-operate with the Meteorological Office by sending regular reports receive copies of the Monthly Meteorological Charts free.

**Dates of Issue of the Charts.**—The weekly instalments of the Monthly Charts of the North Atlantic and Mediterranean appear on Thursday of each week. The Charts of the Indian Ocean are published on the Thursday which is the nearer to the 1st day of the month preceding that to which the information refers.

**Instruments for Observers.**—Subject to certain regulations the instruments necessary for the keeping of a Meteorological Log Book will be lent by the Office to the captains of British ships who undertake to make regular four-hourly records during their voyages to and from foreign ports, enter them in the specially arranged log book provided for the purpose, and return the latter, on completion, to the Marine Superintendent. A rough book for entering up the observations when taken, is also supplied, and this becomes the property of the captain for future reference. The set of instruments lent to captains by the Meteorological Office comprises one mercury barometer, six thermometers, with screen, for registering the shade temperature of the external air and the temperature of the sea surface, and four hydrometers. The expenses incurred by the co-operating captains with respect to postage of log books and the transit of instruments, are borne by the Meteorological Office.

The ships are supplied either directly from the Meteorological Office or through the following agents :—

Cardiff—Captain J. Weir, Examiner of Masters and Mates, Local Marine Board.

Dundee—Captain J. A. S. Chalmers, Examiner of Masters and Mates, Local Marine Board.

Glasgow—Messrs. D. McGregor & Co., Ltd., 57, Bothwell Street.

Greenock—Messrs. D. McGregor & Co., Ltd., 33, Cathcart Street.

Hull—Captain W. Ellery, Examiner of Masters and Mates, Mercantile Marine Office.

Liverpool—Commander F. M. Sergeant, R.D., R.N.R., Chief Examiner and Secretary, Local Marine Board, Canning Place (E.).

Southampton—Captain D. Forbes, 169, High Street.

Sunderland—Messrs. J. J. Wilson & Son, 18, Hudson Road.

Sets of instruments are kept in working order at the Office in London, and at each agency, for the purpose of instructing observers in the method of observation.

## B.—TELEGRAPHIC INFORMATION.

### DAILY WEATHER REPORTS. FORECASTS AND STORM WARNINGS.

Between 7.15 a.m. and 9.30 a.m. telegraphic messages are received daily, reporting meteorological observations at 29 stations (marked T in list of stations, pp. 78 to 100) in the British Isles, chiefly on the coast, at 39 stations (p. 101) on the Continent of Europe, including Gibraltar, and at the Azores, at five stations in Iceland, and one in the Færöe Islands. The observations are now made at 7 a.m. at all stations, except Oxford, Lisbon, and the Azores. A certain number of stations report evening observations (6 p.m.), also by telegram, and those that do not report in the evening include the evening observations with the following morning reports, so that a complete schedule of morning and evening observations is drawn up daily. The information refers to the readings of the barometer, dry bulb thermometer, maximum and minimum thermometers, rainfall, and in some cases, sunshine, with estimates of the direction and force of the wind, and reports of the weather and state of the sea. The observations received from Iceland give only the readings of the barometer and the dry bulb thermometer, the direction and force of the wind, and the state of the weather.

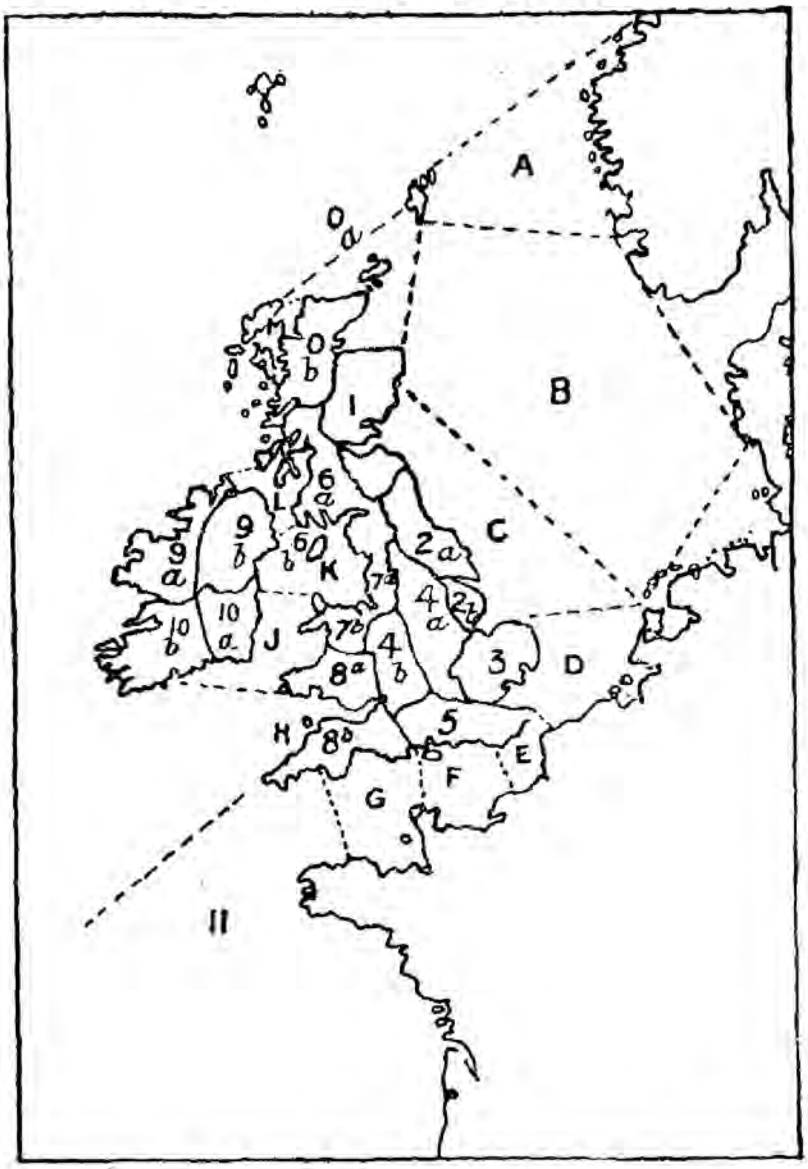
These reports are supplemented by a number of additional observations made at various stations in the United Kingdom, and sent either by telegram or by post, by private persons or local officials. Moreover, the "Bulletin International" published in Paris, reproducing meteorological telegrams from the whole of Europe, is received by post on the morning of the day after publication, and supplements the information previously received in the Office by telegram.

Through the courtesy of the Lords Commissioners of the Admiralty occasional reports of observations at sea off our southern and western coasts are transmitted by wireless telegraphy from the ships of H.M. Navy. Wireless reports are also received almost daily from ocean liners crossing the Atlantic.

The telegraphic information is tabulated and charted by about 9 a.m. for the morning observations, and 7 p.m. for the evening ones. A general report is then drawn up, and forecasts of the weather, **for the twenty-four hours following the next noon, or midnight, as the case may be,** are formulated; a note as to the further outlook is added if the meteorological conditions are such as to justify an anticipation for more than twenty-four hours ahead.

At a selection of stations additional observations are taken and telegraphed to the Office at 1 p.m., and occasionally modifications are made in the morning forecasts as a result of these observations. This information is usually available by 3 p.m.

**Forecast Districts.**—For the purposes of forecasts of weather the region of the British Isles is divided into land districts and sea districts, as indicated in the accompanying map.



FORECAST DISTRICTS.

LAND.*

- 0. SCOTLAND, NORTH. (a.) Islands. (b.) Mainland.
- 1. SCOTLAND, EAST.
- 2. ENGLAND, NORTH-EAST. (a.) North. (b.) South.
- 3. ENGLAND, EAST.
- 4. MIDLAND COUNTIES. (a.) East. (b.) West.
- 5. ENGLAND, SOUTH-EAST.
- 6. (a.) SCOTLAND, WEST. (b.) ISLE OF MAN.
- 7. (a.) ENGLAND, N.W. (b.) NORTH WALES.
- 8. (a.) SOUTH WALES. (b.) ENGLAND, S.W.
- 9. IRELAND, NORTH. (a.) West. (b.) East.
- 10. IRELAND, SOUTH. (a.) East. (b.) West.
- 11. MOUTH OF CHANNEL and Bay of Biscay.

SEA.

- A. SHETLAND AND THE NAZE.
- B. GREAT FISHERY AND DOGGER BANKS.
- C. NORTH SEA, North of the Wash.
- D. NORTH SEA, South of the Wash.
- E. STRAITS OF DOVER.
- F. ENGLISH CHANNEL, East of the Isle of Wight.
- G. ENGLISH CHANNEL, West of the Isle of Wight.
- H. BRISTOL CHANNEL.
- J. ST. GEORGE'S CHANNEL.
- K. IRISH SEA.
- L. NORTH CHANNEL.
- M. THE MINCH.

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* For the grouping of the counties to represent approximately the forecast districts, *see* List of Stations, pp. 78 to 100.

## THE DISTRIBUTION OF FORECASTS AND TELEGRAPHIC INTELLIGENCE.

**Daily Weather Report.**—A Daily Weather Report, which includes a transcript of the observations for the day, with some of those for the previous day, illustrative charts, descriptive remarks on the state of the weather, and the weather prospects for the several districts of the British Isles and for the Bay of Biscay, is prepared for press at 11 a.m. daily, except on Sundays and Bank Holidays. It is ready for issue by 1 p.m., and is then delivered by hand or posted by book post at 1.30 p.m. to those addresses which can be reached in the regular course of post on the same day. Copies for those who are outside this limit are posted by the evening mails.

**Subscriptions.**—The Daily Weather Report may be obtained on payment in advance at the Meteorological Office of the cost of transmission (postage and wrappers). The subscription for this service, if for not less than a quarter of a year ending at the official quarter days, *e.g.*, March 31, June 30, &c., is at the rate of £1 per annum for delivery by book post, £2 for delivery, where feasible, by hand. Copies for other periods than the official quarters of a year are charged at the rate of 2*s.* for a calendar month and 1*d.* per copy for periods of less than a month. When two copies are required to be sent by post each day, in the same envelope, the charge is 7*s.* per official quarter or £1. 7*s.* 0*d.* per annum. Single copies, price 1*d.* each, can be obtained after 2 p.m. on the day of issue at the Office, and at the railway bookstalls at the following terminus stations:—Victoria (L.B.S.C., and S.E. & C. Railways), Charing Cross, King's Cross, St. Pancras, Euston.

**Reports for Educational Purposes.**—By arrangement with H.M. Stationery Office, upon giving the necessary notice, additional copies of the Daily Weather Report for one day, or a succession of days, will be printed off and supplied for class use at the rate of 7*d.* for 10 copies, exclusive of postage.

Surplus copies of charts prepared for exhibition, or of back numbers of the Daily Report, are available for educational purposes upon application to the Director. No charge is made for this service, but the cost of postage must be defrayed.

**Reports for the Press.**—Special advance copies of the descriptive remarks on the state of the weather and forecasts, based upon the morning or evening observations, are prepared at 10 a.m. and 8 p.m. respectively, and supplied gratis to the representative of any newspaper or press agency calling for them at the Office at the hours named.

As far as practicable the Director, upon application, will make arrangements for the transcription of the whole or a selection of the morning or evening telegraphic reports, to be sent by telegraph, in code form, to newspapers or public associations desiring to make use of this means of accelerating the distribution of the latest information about the weather. The special terms for this service can be obtained on application to the Office.

The Director will also arrange for the supply of daily or weekly reports of the state of the weather, in special form, upon terms which may be had upon application at the Office personally or by letter.

**Public Exhibition.**—The latest reports and forecasts for the land districts and for the Western Channel and Bay of Biscay, with a map, are exhibited as early as possible, for the information of the public, at the entrance to the Office, and, by the courtesy of His Majesty's Office of Works, in St. James's Park, opposite the Horse Guards.

Typewritten copies of the morning forecasts for all districts are ready at 10 a.m., and are distributed by hand to clubs and societies situated in or near Pall Mall at a charge of 10*s.* per annum. They are sent by post at a charge of 2*s.* 6*d.* per official quarter or any part thereof, in addition to the cost of transmission. Copies of the evening forecasts are sent by post for a similar charge.

Forecasts for a single district will be sent regularly by telegraph to public bodies for exhibition without any charge beyond the cost of the telegrams, and to private persons at an additional charge of 3*d.* per telegram for a forecast for a single district, and 6*d.* for two or more districts.

**Written Special Forecasts.**—A written copy of the latest forecast for a single district can be obtained at the Office between 9.30 a.m. and 8 p.m. upon payment of 6*d.* A written copy of the latest information in possession of the Office as to the state of the weather in any district of the British Isles, and for the neighbouring parts of the continent of Europe, can also be obtained.

**Inquiries by Telegraph.**—By arrangement with H.M. Postmaster-General (*see* the Post Office Guide, "Meteorological Telegrams"), the latest information as to the state of the weather in various parts of the United Kingdom, or the Continent, and forecasts for one day in advance, can be obtained from the Meteorological Office, upon payment at any Postal Telegraph Office of a fee of 6*d.* in addition to the cost of a telegram of inquiry addressed "Weather, London," and of the reply. Ten words, in addition to the address, must be allowed for the reply.

Telegrams of inquiry should state the nature of the information required, and the name and address to which the information is to be sent, as in the following examples :—

To "Weather, London."

*Latest Information from* [*Straits of Dover*].

or,

*Latest Forecast for* [*Forfarshire*].

or,

*Next forecast for* [*Dublin*].

From (Name), (Address).

The *latest information for any district*, or *the latest forecast*, will be sent by telegraph to any address if a request be received by post stating when the information or forecast is to be sent, and enclosing 6*d.* *in addition to the cost of a telegram*, allowing ten words in addition to the address. It should be noted that forecasts are prepared for issue at 10 a.m. and 7.30 p.m. To avoid delay, letters of request for telegraphic information or forecasts should be marked on the outside "Forecast Branch."

**Inquiries by Telephone.**—Forecasts will be sent in reply to inquiries by telephone if a sum has been previously deposited with the Office to cover the authorised charges for departmental expenses. Further information as to the service by telephone can be obtained on application at the Office.*

**Harvest Forecasts.**—Arrangements have been made for a special service of afternoon reports during the season of the Hay and Corn Harvests (June 1st to September 30th), with a view to a special series of forecasts daily (Sundays excepted) at 2.30 p.m. The forecasts for any district are supplied by telegraph to agriculturists and others upon prepayment of the cost of the telegrams (sixteen words daily in addition to the address) for the period during which the forecasts are required. Forms of application for these forecasts can be obtained at the Office.

The Postmaster-General has sanctioned the exhibition of Forecasts at Local Post Offices, provided space is available, if the persons to whom they are addressed desire them to be so exhibited.

**Forecasts in Anticipation of Special Conditions.**—The Office will send by telegraph or telephone forecasts in anticipation of special conditions, such as spell of frost or of dry weather, smooth sea, &c. If the time of sending the forecast be left to the discretion of the Office a fee of 2*s*. 6*d*., which includes the cost of the telegram, is charged for this service.

**Notification of Spell of Settled Weather.**—In order to make the fullest use of the information available when the weather appears likely to be settled for some days, provision has been made for sending telegraphic notifications of the expected commencement of spells of fine weather, and such further notifications as may be necessary in order to keep the recipient informed of the course which is being followed. For this service a fee of 5*s*., which includes the cost of the telegrams, is payable in advance for each spell.

## STORM WARNINGS.

The Office issues notices of threatening atmospherical disturbances on or near the coasts of the British Islands (free of charge) to ports and fishing stations recommended by responsible local authorities.

The issue of a warning indicates that an atmospheric disturbance is in existence which will *probably* cause a gale within a distance of (say) 50 miles of the place to which the warning is sent. The Signal Station itself is sometimes comparatively sheltered. The meaning of the warning is simply, "Look out! Bad weather of such and such a character is probably approaching you."

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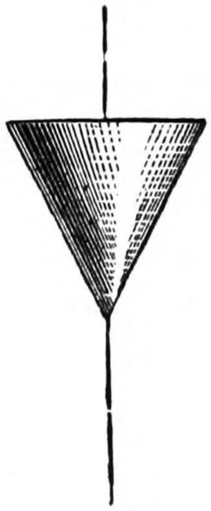
* *Note.*—A forecast is a statement of the weather to be expected during the period to which the forecast refers, arranged, generally speaking, as follows:—Direction and force of the wind, state of the sky as regards cloud, prospect of rain, snow, or thunder, temperature, and, in the case of the sea districts, sea disturbance. For example, the forecast for a land district referring to the twenty-four hours from the following noon or midnight, according to the time of issue, may read: "Light south-easterly to easterly winds; fine at first, cloudy later, with local thunder showers. Becoming cooler." The forecast for a sea district may read: "Strong southerly and south westerly winds, with squally, showery weather and a rough sea."

**Storm Signals.**—The fact that one of these notices has been received at any station is made known by hoisting a black canvas cone, 3 feet high, and 3 feet wide at base, which has the appearance of a triangle when hoisted.

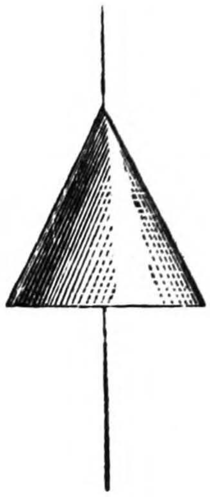
## STORM SIGNALS EXHIBITED.

### DAY SIGNALS.

South Cone.



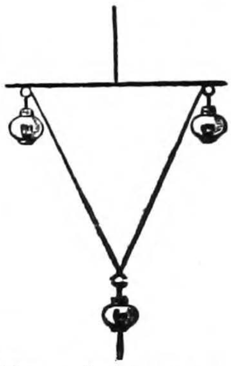
North Cone.



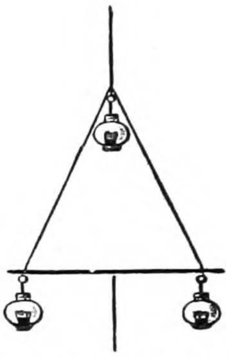
### NIGHT SIGNALS

(Instead of the cone), Lights in Triangle.

For South Cone.



For North Cone.



Three lanterns and one yard, 4 ft. long, will be sufficient.

The "*South*" *Cone* (point downwards) is hoisted for gales and strong winds—

From S.E., veering to S.W., W., or N.W.,
„ S.W., veering to W. or N.W.,
„ W., veering to N.W.,

and also from E., veering to S. or S.W.

The "*North*" *Cone* (point upwards) is hoisted for gales and strong winds—

From S.E., E., or N.E., backing to N.,
„ N.W., veering to N., N.E., or E.,
„ N., veering to N.E. or E.,
„ N.E., veering to E.

**Sudden Shifts of Wind.**—A Southerly gale often *veers* quickly to a point North of West, but a gale from the Eastward is more likely to *back* to the *Northward.*

It is important to bear this in mind, especially in anchorages or harbours exposed to the Northward.

**Night Signals.**—At dusk, whenever a signal ought to be flying if it were daylight, a *Night Signal*, consisting of three lanterns hung on a triangular frame, may be hoisted in place of the cone, point downwards (for South Cone), or point upwards (for North Cone), as the case may be.

**Duration of Warning.**—The warning is intended to continue from the time the telegram leaves the Meteorological Office until 8 o'clock on the evening of the following day.

Gales sometimes follow one another in quick succession. An order to "Keep up" will be sent if the warning is to be continued beyond the ordinary limits; and an order to "Lower" will be sent if there is reason to believe that danger is over before the regular time has lapsed.

If a gale has commenced before warnings are issued, notice to hoist the cone will still be sent if it is expected that the gale will continue, or increase in force, but not otherwise.

**Exhibition of Telegrams.**—The telegrams directing the cone to be hoisted are exhibited near the signal staff.

**Supply of Cones, &c.**—The Meteorological Office supplies the canvas cone and a card providing space for the exhibition of the telegrams and giving information as to the meaning of the warnings, but it does not supply the lanterns for night signals. In all cases the local authorities must undertake the charges incidental to the hoisting of the signal, such as the provision of a flagstaff and gear, oil, &c., and also those connected with the keeping of the apparatus in repair.

## LIST OF STORM SIGNAL STATIONS.

The following is a LIST OF STATIONS to which STORM-WARNING telegrams are sent:—

### NORTHERN.

*Scotland, N.E.*—Lerwick, Scalloway, *Dunrossness, Sumburgh Head L.H., Fair Isle L.H., Noup Head L.H., Stromness, Kirkwall, Cantick Head L.H., Thurso, Dunnet Head, Wick, Tarbet Ness L.H., Cromarty, Avoch, Inverness, Nairn, Burghead, Lossiemouth, Buckie, †Port Knockie, Cullen, Portsoy, Banff, Fraserburgh, Peterhead, †Aberdeen, Girdleness L.H.

*Scotland, E.*—Stonehaven, Montrose, Scurdy Ness L.H., Broughty Ferry, Dundee, St. Andrews, Anstruther, Buckhaven, Methil, Wemyss West, Burntisland, *Grangemouth, Bo'ness, Granton, *Newhaven, †Leith (2 stations), Fisherrow, *Dunbar, Cockburnspath, St. Abb's Head, St. Abbs, Eyemouth.

*Scotland, N.W.*—Cape Wrath L.H., Stourhead L.H., Port of Ness, Stornoway, Island Glass L.H., Portnaguran.

*Scotland, W.*—*Glasgow, Greenock, Rothesay, Lamlash, Carradale, Campbeltown, Mull of Cantire L.H., Rhuvaal L.H., Rhinns of Islay L.H., Ardrossan, Girvan, Ballantrae, Cairn Ryan, Corsewall Point L.H., Mull of Galloway L.H.

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* Telegrams only exhibited.

† Arrangements made for showing signals or illuminating the cone at night.

## WESTERN.

*Ireland, S.*—Tuskar L.H., New Ross, Dunmore East, Dungarvan, Helvick Head, Minehead L.H., Youghal, Queenstown (2 stations), Cork, Passage, Kinsale, Kinsale (Old Head), Galley Head L.H., Castletownshend, Fastnet Rock L.H., Brow Head, Dingle, Tralee, †Limerick, Loophead L.H., Galway.

*Ireland, N.*—Killybegs L.H., Mulroy, Lough Swilly L.H., Rathmullen, Malin Head, Portrush, Port Ballintrae, Ballycastle.

*Irish Sea.*—Belfast, Donaghadee, Howth, Kingstown, Point of Ayre, Ramsey, Douglas, Silloth, Maryport, Workington, Whitehaven, Barrow, Walney Island L.H., Morecambe, Fleetwood, Blackpool, Lytham, Preston, †Southport (2 stations), Formby, Liverpool, Runcorn, New Brighton, Hoylake, New Ferry, Penmaenmawr, Port Penrhyn, Point Lynas L.H., Holyhead, South Stack L.H., Carnarvon, Port Dinorwic.

*St. George's Channel.*—Aberystwyth, Smalls L.H., *Milford.

*Bristol Channel.*—Caldy L.H., Pembrey, Llanelly, Swansea, Briton Ferry, Porthcawl, Nash L.H., Penarth, Cardiff (Bute Dock and Barry Dock), Newport, Weston-super-Mare, Burnham, Bridgwater (2 stations), Ilfracombe, Bull Point L.H., *Barnstaple, Appledore (2 stations), Hartland Point L.H., Lundy Island, Port Isaac, Newquay, Godrevy L.H., Hayle, St. Ives, St. Sennen, Newlyn West, Penzance.

## SOUTHERN.

*England, S.W.*—Scilly, the Lizard, Falmouth (Pendennis Castle), Mevagissey, Plymouth (2 stations), Devonport (Mount Wise and the †Dockyard), Prawle Point, Salcombe (2 stations), Teignmouth, Exmouth.

*England, S.*—Guernsey, Jersey (St. Helier's, 2 stations), Portland Dockyard, Portland L.H., Weymouth, Anvil Point L.H., Poole, Hurst Castle L.H., Southampton (2 stations), Yarmouth (I. of W.), Cowes (2 stations), Ryde, St. Catherine's Point, Portsmouth (Dockyard and Noman's Fort), Littlehampton, Brighton, †Newhaven.

*England, S.E.*—Beachy Head, Eastbourne, †Hastings, Rye, Sandgate, Dover (2 stations), Deal, Ramsgate, Margate, Faversham (2 stations), Sheerness, Chatham, Greenhithe, Shoeburyness.

## EASTERN.

*England, N.E.*—Berwick-on-Tweed, Blyth, Tynemouth (3 stations), South Shields (2 stations), Souter Point L.H., Sunderland, Hartlepool, †Middlesbrough, Redcar, Whitby, Filey, Flamborough (2 stations), Bridlington, Hull, *Goole, Grimsby, Boston.

*England, E.*—*Sutton Bridge, Lynn, Sheringham, Cromer, Great Yarmouth (3 stations), Gorleston, Southwold, Orford Ness L.H., Ipswich (2 stations), Harwich, Gunfleet L.H., West Mersea.

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* Telegrams only exhibited.

† Arrangements made for showing signals or illuminating the cone at night.

## C.—STATISTICAL INFORMATION.

### THE BRITISH METEOROLOGICAL YEAR BOOK.

**Terms of Subscription.**—The Statistical Publications of the Office have been grouped together under the general title "British Meteorological Year Book." For 1910 the Year Book consists of four parts, as follows :—

Part I.—The Weekly Weather Report. Issued on Thursday of each week. Price 6*d.* per number. Annual subscription (which includes the Monthly Weather Report, *see* below) 30*s.* postage paid. The appendices to the report can be obtained separately, price from 4*d.* each.

Part II.—The Monthly Weather Report with an annual summary. Issued on the 27th of each month as supplement to the Weekly Weather Report. Price 6*d.* each issue.

Part III.—Observations at Stations of the Second Order and at Anemograph Stations. Issued in monthly parts, within about five weeks of the close of each month. Price 1*s.* 6*d.* each issue. Annual Volume consisting of 12 monthly numbers with Introduction, Title Page and Map, 16*s.*

Part IV.—Hourly Readings at the four Observatories in Connexion with the Meteorological Office. Issued in monthly sections for each observatory within about six weeks of the close of each month. Price 6*d.* each section. Annual Volume with Title Page and Introduction, 25*s.*

Parts I. and II. of the Year Book can be purchased either directly or through any bookseller from the Agents to H.M. Stationery Office, Messrs. Wyman & Sons, Fetter Lane, E.C., Oliver and Boyd, Edinburgh, and E. Ponsonby, 116, Grafton Street, Dublin. Parts III. and IV. are on sale at the Meteorological Office only. (For terms of subscription to the Daily Weather Report, *see* p. 63.)

Copies of the British Meteorological Year Book are sent to the following public libraries and private institutions in London, viz. :—

The British Museum ; Guildhall Library ; Imperial Institute ; Royal Botanic Gardens* ; Royal Society‡ ; Royal Astronomical Society ; Royal Meteorological Society ; The Society of Arts* ; Lloyd's ; Royal United Service Institution ; London Institution ; Solar Physics Observatory‡ ; Royal Institution ; General Register Office* ; Royal Observatory, Greenwich ; Royal Naval College, Greenwich ; Board of Education (Science Library, South Kensington) ; Institution of Civil Engineers ; Local Government Board* ; Board of Trade* ; Board of Agriculture and Fisheries† ; The Admiralty† ; Royal Society of Medicine§ ; The Metropolitan Water Board ; British Rainfall Organization ; Kew Observatory.

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* Parts I. and II. only.
† Parts I., II., and III. only.
‡ Parts III, IV. only.
§ Part II. only.

Copies are also filed at the public libraries at Aberystwyth,* Birmingham, Bradford,* Brighton,* Darwen,* Dumfries,* Guernsey* (Guille-Alles Library), Huddersfield,* Liverpool, Middlesbrough,* Penzance,* Preston,* Rhyl,* Stamford,* Shrewsbury,* Swansea,* Southend,* Great Yarmouth,* as well as at the University Libraries of Edinburgh; Trinity College,* Dublin; Queen's College,* Belfast; Birmingham; Leeds*; the Radcliffe Observatory, Oxford, and the Philosophical Library,* Cambridge.

## PART I.—WEEKLY WEATHER REPORT WITH APPENDICES.

**Weekly Summaries.**—The Weekly Weather Report gives a summary of the weather of the week ending with Saturday, intended principally for agricultural and sanitary purposes.

An advance copy of the MS. of the Weekly Report is prepared on Tuesday in each week, and is supplied free of charge to newspapers.

A division of the country into twelve districts, which are identical with the forecast districts of the Daily Weather Report, is adopted. The districts are further grouped into extreme north, eastern and western districts, and extreme south (islands in the English Channel).

In its present form the Report contains:—

I.—General remarks on the meteorological conditions of the week, with a table describing in words the divergence of the warmth, rainfall, and sunshine experienced in each district from the average for the district for the time of the year, and further tables summarising the weekly tables for the season and the four preceding seasons.

II.—A table summarising in numerical form the conditions of temperature, rainfall, and sunshine for each district for the week, the current season, and the calendar year.

III.—A table containing the data from stations from which the values for districts are calculated.

IV.—A table containing information for selected stations concerning the minimum temperature on the grass and the temperature in the ground.

V.—A table giving information of the temperature of the sea-water at a selection of stations on the coasts of the British Isles.

VI.—A series of maps showing the distribution of pressure and wind over Europe and Iceland at 7 a.m. and 6 p.m. on each day, and the temperature, weather, and sea disturbances at 7 a.m. each day. The maps for each day are accompanied by a brief account of the distribution of weather for that day, and the changes which have taken place.

VII.—A table giving the results of observations of the upper air taken by means of kites and balloons. These results include particulars as to temperature, humidity, and wind (direction and force) at various levels.

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* Parts I. and II. only.

The weekly statistical tables of values for districts have been prepared in their present form since 1878.

For the maps and descriptive account, the daily telegraphic reports are used, and are supplemented by the information contained in the "Bulletin International" already referred to (p. 61), so that the area represented is much larger than that covered by the Daily Weather Report.

For the statistical summaries, the information from the telegraphic reporting stations in the British Isles is supplemented by returns of daily observations supplied by volunteer observers from over 100 other stations. Of these 27 supply only the daily amounts of bright sunshine.

**Appendices.**—Subscribers for the Weekly Weather Report receive the following appendices :—

(*a.*)* An *Appendix*, issued quarterly and annually, containing *quarterly and annual summaries of the rainfall, mean temperatures* and *bright sunshine* of each district for each year since 1878.

(*b.*) An *Appendix*, issued annually, giving *weekly and progressive totals* of rain-days, rainfall, accumulated temperature, and duration of sunshine with percentage of its possible amount, for the several districts.

(*c.*) An *Appendix*, issued annually, giving a summary of the *gales* experienced at anemograph stations in connexion with the Office.

(*d.*) An *Appendix* computed every fifth year, giving the *weekly values* of the different elements in the *five years*, and for the whole period, since 1881.

(*e.*) An *Appendix*, which is also prepared every fifth year, giving the *monthly averages* of rainfall, rain-days, maximum temperature, minimum temperature, mean temperature, duration of bright sunshine and percentage of possible bright sunshine, for as many as possible of the stations included in the Weekly Weather Report.

## PART II. MONTHLY WEATHER REPORT AND ANNUAL SUMMARY.

**Monthly and Annual Summaries.**—The Monthly Weather Report is issued as a supplement to the Weekly Weather Report. Each number contains (1) a general account of the weather for the month ; (2) a complete summary of the observations at the Telegraphic Reporting Stations, and at Normal Climatological Stations ; (3) a summary of maximum and minimum temperature, temperature in the ground and on the grass, rainfall, and sunshine at auxiliary Climatological Stations ; (4) the differences, where possible, from the average pressure, temperature, rainfall and sunshine ; (5) four maps showing the monthly distribution of barometer and wind, the movements of barometric depressions, the distribution of mean temperature, and the distribution of bright sunshine ; (6) a full-page map prepared by the Director of the British Rainfall Organization from data from nearly 1,000 stations showing the distribution of Precipitation.

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* A special Appendix will be issued during the current year containing the quarterly and annual summaries from 1878 to 1910 inclusive, and giving diagrams illustrating the variations in the different districts during that period. Beginning with 1911, the usual Appendix I. will include the values for the 6 lustra, 1881 to 1910, and the values for the individual quarters from 1911 onwards.

The number for March, 1911, contains tables of results for 222 stations, namely :—26 telegraphic stations and 96 normal climatological stations, together with a summary of temperature, rainfall, and sunshine, or one or more of these elements, at 100 other stations. For 13 of the 26 telegraphic stations summaries are given for the hours 7 a.m., 1 p.m., 9 p.m., a combination which entitles the stations to rank as normal climatological stations.

An Annual Summary on similar lines has been added since the year 1904.

## PART III. METEOROLOGICAL OBSERVATIONS AT STATIONS OF THE SECOND ORDER AND AT ANEMOGRAPH STATIONS.

**Daily Readings.**—This publication contained, up to and including 1910, daily values for 20 stations in the British Islands of observations made at stations of the second order at 9 a.m. and 9 p.m. Particulars of the headings under which observations are taken are given on p. 79. The publication also contained daily summaries of the records from 12 stations equipped with autographic anemometers.

It contains for 1911 daily values for 16 stations for 9 h. and 21 h., wind components for four stations at 3, 9, 15, 21 h., and daily meteorological and magnetic data for three observatories, and electrical, solar, and seismic data at two observatories.

A similar publication, containing meteorological observations but no data from anemograph stations, has been issued in annual volumes since 1876. These annual volumes, up to and including 1907, contain, in addition, monthly and annual summaries for a large number of stations which are now included in the Monthly Weather Report. The prices of the volumes vary from 20*s.* to 35*s.*

## PART IV. HOURLY READINGS OBTAINED FROM THE SELF-RECORDING INSTRUMENTS AT FOUR OBSERVATORIES IN CONNEXION WITH THE METEOROLOGICAL OFFICE.

This publication contains hourly values of pressure, dry bulb temperature, humidity, wind direction and velocity, rainfall and bright sunshine for each of the four observatories—Valencia,† Aberdeen,* Falmouth,* Kew.† Particulars of the corresponding publications for previous years are given on p. 108.

## UNPUBLISHED OBSERVATIONS.

The Office also receives, in return for an annual grant, duplicates of the curves from the autographic instruments at Glasgow* and Stonyhurst* observatories, and the tabulations of these curves are available if required.

Anemographic records are received from Alnwick Castle, Armagh,* Brighton, Deerness,* Dover, Dublin,* Falmouth (Pendennis Castle), Fleetwood, Holyhead,† Kingstown, Llaneugrad, North Shields, Plymouth, Pyrton Hill, Roche's Point, Scilly,† Shoeburyness, Southport, Warlingham, and Yarmouth.†

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* Results from anemographs at these stations are now published in "Daily Readings at Stations of the First and Second Order."

† Results from anemographs at these stations are now published in the "Geophysical Journal."

The names of all stations in the British Isles from which information of any kind is received, and a statement of the order of the stations and of the publication for which the returns are prepared are given in the lists on pp. 78 to 100. All the records are available for the use of the public on the conditions set forth on p. 57.

## D.—INFORMATION FROM LAND STATIONS OUTSIDE THE BRITISH ISLES.

**Foreign and Colonial Stations.**—Periodical returns are received from certain stations in different British Colonies and dependencies, or in foreign countries.

A list of the stations, stating the character of the observations taken, is given on pp. 103 to 106. It includes two anemometer stations, Gibraltar and St. Helena.

The information contained in these returns is available upon the same conditions as that contained in the returns of British Stations.

## E.—THE LIBRARY.

**Library.**—In return for copies of publications the Office receives the weather reports and other publications of the official meteorological organisations of the world, and of many private organisations. A list arranged geographically of the institutions sending periodical publications containing meteorological data is given in Appendix VII.

The library has also gradually acquired a large collection of pamphlets and books bearing upon meteorological subjects.

The terms on which books and documents in the library can be consulted are stated on p. 57.

## F.—SUPPLY OF INSTRUMENTS AND FORMS TO OBSERVERS.

**Loan of Instruments.**—In accordance with the terms of the Parliamentary grant the Office does not lend instruments for the use of observers except in the following cases :—

(1.) To the Captains of vessels who undertake to keep a Meteorological log during their voyage and forward it to the Office. (*See* p. 60.)

(2.) To the Telegraphic Reporting Stations in the British Isles.

(3.) To the First Order Stations in connexion with the Office.

(4.) To selected Stations in less frequented parts of the world where observations are deemed to be specially desirable.

(5.) To a limited number (230) of fishing communities.

**Supply of instruments for observers at Land Stations.**—The Director is authorised to supply, at a cost of 5 per cent. in addition to the contract prices and the cost of carriage, trustworthy instruments for standard meteorological observations to those who are willing to send copies of their observations to the Office. The risk of breakage in transit must be undertaken by the consignee. The Director will also, if desired, give advice about the site and exposure of the instruments.

**Supply of forms.**—Forms for recording the observations, and tables for reducing them, are supplied to observers for the Office free of charge. The postage of returns, addressed to the Director of the Meteorological Office, need not be prepaid.

Blank sunshine cards are supplied without charge to a number of stations, not exceeding 10 in each district (including official stations), on condition that the cards are returned to the Office for filing. In other cases, cards are supplied, at a special price, to observers contributing returns. Forms for other self-recording instruments are supplied to a limited number of observers free of cost, provided that the records are deposited with the Office and that the forms required are of a type kept in stock by the Office for use at Official Stations.

For further information as to the supply of instruments, forms, &c., application should be made to the Office.

## FISHERY BAROMETERS.

The Office possesses a number of Barometers which it lends for the use of fishing communities, where it is shown that the instrument will be of material service. As a condition of the loan the community is required to provide for the housing of the instrument and to keep and forward to the Office a record of daily readings. At a few of the stations the experiment has been made of lending a self-recording aneroidograph with an open scale instead of the ordinary mercurial barometer.

A copy of a manual specially compiled for the purpose accompanies the instrument, and is intended to point out in simple language the practical use of the Barometer, with a view to anticipating important changes in the weather in the neighbourhood of the fishing stations. The following is a list of stations that have been supplied with Fishery Barometers :—

### LIST of STATIONS supplied with FISHERY BAROMETERS.

*Shetland Isles.*—*Uya Sound, Burravoe, *Nesting, Lerwick, *Sandwick, *Scalloway, Symbister, * Hamnavoe, *Walls.

*Orkney Isles.*—*Westray, Papa Westray, *Burray, *Kirkwall, Barswick.

*Scotland, East coast.*—*Duncansbay, *Freswick, *Auchengill, *Keiss, *Ackergill, *Staxigoe, *Wick, *Lybster, *Dunbeath, Hilton, *Inver, *Portmahomack, *Ballintore, *Cromarty, *Avoch, *Nairn, *Burghead, *Portessie, *Port Knockie, *Portsoy, *Whitehills, *Gardenstown, *Rosehearty, Pitullie, *Fraserburgh, *Inverallochy, Pointlaw, Portlethen, *Skateraw, *Stonehaven, *Arbroath, *Broughty Ferry, *St. Andrews, *Crail, *Cellardyke, *St. Monance, *Burntisland, *Newhaven.

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* The Director has been in correspondence with the Fishery Boards concerning these stations.

*England, East coast.*—*Berwick, Blyth, *North Shields, *South Shields,* Sunderland (Roker), *West Hartlepool, *Staithes, *Scarborough, *Filey, *Flamborough, *Bridlington Quay, *Withernsea, *Hull, *Lynn (2), *Wells, *Gorleston, *Lowestoft, *Walberswick, *Harwich, *Brightlingsea, *West Mersea, *Maldon, *Leigh, *Margate, *Deal, *Kingsdown, *Dover.

*England, South coast.*—*Bognor, *Ryde, *Bembridge, *Brixton, *Atherfield, *Ventnor, *Yarmouth (Isle of Wight), *Poole, *Weymouth, *Portland.

*Channel Islands.*—Gorey (Jersey).

*England, South-West coast.*—*Budleigh Salterton, *Exmouth, *Cawsand, *Mevagissey, *Gorranhaven, *Devoran, *Portscatho, *Penryn, *Durgan, *Porthallow, *Falmouth, *Coverack, *Newlyn (2), *Mousehole, *Penberth Cove, *Porth Guarra, *St. Ives, *Hayle, *Port Isaac, *Bideford, Burnham, Highbridge, Weston-super-Mare.

*Wales.*—*Briton Ferry, *Swansea, *Angle, *Milford, *Aberystwyth, *Carnarvon.

*England, North-West coast.* — *Fleetwood, *Morecambe, *Maryport.

*Isle of Man.*—Douglas, Port St. Mary, Peel (2).

*Scotland, South-West coast.*—*Port Patrick, *Cairn Ryan, *Port William.

*Ireland, East coast.*—Belfast, Bangor, Groomsport, Donaghadee, Ardglass, Carlingford, Glenarm, Greenore, Dundalk, Malahide, Howth, Kingstown (2), Bray, Wicklow.

*Ireland, South coast.*—Dunmore East, Dungarvan, Kinsale, Union Hall, Castletownshend, Baltimore, Schull (2), Crookhaven, Castletown (Berehaven), Lawrence Cove, Ballydonegan, Ballycrovane.

*Ireland, West coast.*—Valencia, Dingle, Tralee, Kilronan, Galway, Spiddal, Cleggan, Elly Bay, Ballyglass, Ballycastle (Co. Mayo), Mullaghmore, Donegal, Tribane, Killybegs, Teelin, Malinmore, Port Noo, Burton Port, Kincashla, Bunbeg, Inniscoo Island.

*Ireland, North coast.* — Dunfanaghy, Rathmullen, Buncrana, Malin Head, Moville, Greencastle, *Port Stewart, *Portrush, *Port Ballintrae, Ballintoy, *Ballycastle (Co. Antrim).

*Scotland, West coast.*—*Lamlash, *Tarbert (Loch Fyne), *Loch Ranza. *Campbeltown, *Carradale; *Portnahaven, *Port Wemyss, Gruinard, and *Bowmore (Islay); *Mallaig; *Portree and *Armadale (Isle of Skye); *Isle of Soay, *Kyle of Lochalsh, *Plockton, *Ardneaskan, Shieldaig, Badachro, Ullapool, *East Mey, *Gills, *Stroma (2).

*Hebrides.*—*Ness, *Carloway, *Marvaig, *Crossbost, Stornoway, Portnaguran, Valtos, Obb, Bernera, *Boreray, *Lemreway, Loch Boisdale.

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* The Director has been in correspondence with the Fishery Boards concerning these stations.

## G.—PUBLICATION OF OBSERVATIONS CONTRIBUTED BY VOLUNTEER OBSERVERS OR BY THE REPRESENTATIVES OF LOCAL AUTHORITIES.

**I. General Regulations.**—(*a.*) The observations must in all cases be taken by a competent observer, from approved instruments, satisfactorily exposed. Approval of the instruments and exposure is subject to periodical inspection by the Office.

Regularity in taking the observations and dispatching the reports is essential.

(*b.*) The sunshine cards upon which returns have been based must be sent to the Meteorological Office for examination at the close of each month. Cards supplied to observers at the special price referred to on p. 74 will be returned after examination.

(*c.*) The Director reserves the right to discontinue at any time, temporarily or permanently, the incorporation of information received from any station in the Official reports.

(*d.*) Observers contributing returns to one of the publications of the Office receive an official copy of the publication. It is requested that these copies may be filed in a public library or similar institution, or be returned to the Office when the observer has no further personal use for them.

**II. Publication in the Daily Weather Report.**—For publication in the Daily Weather Report, the information must be in accordance with one of the forms here specified :—

(*a*) **Full Telegraphic Report at 7 a.m.**—A complete record of barometer, temperature, wind, &c., based upon observations made at 7 a.m., and at 6 p.m. of the previous day, and telegraphed each morning in time to reach the Office not later than 9 a.m. This information must be sent in code, a copy of which, with other necessary instructions, will be supplied by the Office. A manuscript copy of the observations on a form provided for the purpose must be sent at the end of each month.

(*b.*) **Short Telegraphic Report at 6 p.m.**—A report, telegraphed in the evening, and containing observations of the barometer, wind, temperature and weather at 6 p.m., the maximum temperature and the amount of bright sunshine for the day, and the minimum temperature and the amount of rainfall for the previous 24 hours. These observations must be sent in code form in time to reach the Office not later than 7 p.m., the statistical information being supplemented by brief notes respecting any exceptional phenomena which may have occurred, such as thunderstorms, unusually heavy rain, &c.

When the sun is above the horizon after 6 p.m., *i.e.*, from about March 20th to September 23rd, the amount of sunshine given must be that recorded up to *6 p.m. only*, but in such cases a post card must be dispatched to the Office later in the evening, giving the amount *for the whole day*.

In exceptional circumstances a telegraphic report of sunshine only may be accepted, provided that it is supplemented by information by post.

The cost of telegraphy must be borne locally.

Information derived from the 6 p.m. telegraphic reports is included in the evening remarks and summaries prepared in the Office for communication to Newspapers and Press Agencies. It must be supplemented whenever possible by the postal report at 9 p.m. described under (*c*).

(*c.*) **Postal Report at 9 p.m.**—A record similar to that indicated under (*b*), but reporting observations by postcard (Form 231). If the postal arrangements are such that a letter posted after 9 p.m. can be delivered at the Meteorological Office by 9 a.m. on the following day, the report should be made up for the 24 hours ended 9 p.m., and posted immediately after that hour.

(*d.*) **Postal Report at 6 p.m.**—In places where the postal arrangements do not admit of the service indicated under (*c*), a report in similar form may be made up for the 24 hours ended 6 p.m. and posted as soon as possible after that hour.

NOTE.—At auxiliary climatological stations, for which extremes of temperature and rainfall amounts for the 24 hours ending at 9 a.m. are required, as well as the data referred to in the messages dispatched at 6 p.m., separate minimum thermometers and raingauges should be provided for the two sets of observations. A single maximum thermometer will suffice, if the instrument be read, but not *set*, at 6 p.m. At normal climatological stations, when the extremes of temperature used for climatological purposes should be for the 24 hours ending 9 p.m., a double set of thermometers is not required if both thermometers are *set* only once a day, viz., at 9 p.m.

**III. Publication in the Weekly Weather Report.**—Observations are accepted from a limited number of stations for publication in the Weekly Weather Report. The information should consist of observations taken once daily of the maximum and minimum temperature and of the rainfall, together with the duration of bright sunshine, and brief notes on the weather of each day.

Observations of the minimum temperature on the grass, and of underground temperature at the depths of 1 foot and 4 feet are also included. Each return should be posted as soon as possible after the Sunday morning reading, in order that it may reach London by Monday.

**IV. Publication in the Monthly Weather Report, and in the Monthly Issue of Daily Readings at Stations of the First and Second Orders.** For this purpose a monthly return must be sent so as to reach the Office *not later than the 10th* of the following month. Three forms of return are at present in use. In Form 355 provision is made for the complete set of observations made at a normal Climatological Station at which observations are recorded three times a day. In Form 319, the headings of the columns are similar, but they are arranged in different order, and provision is made for the entry of only two observations each day. Form 312 is similar to Form 319, but less extended.

## H.—REGULATIONS FOR THE SUPPLY OF INFORMATION FROM INSTRUMENTS BELONGING TO THE METEOROLOGICAL OFFICE BY THE CUSTODIANS OF THE INSTRUMENTS.

The custodians of instruments maintained by the Meteorological Office are not allowed to supply information derived from the instruments in their charge without previous permission obtained from the Director.

Permission is not given when the information required can be obtained directly from the Office in the course of post. Applicants for information should in that case be referred to the Office.

In special circumstances the Director will give permission for information to be extracted by the custodian for the use of Local Authorities, provided—

(1) That a note shall be appended to the information thus supplied to the effect that "The information is derived from instruments belonging to the Meteorological Office, and is subject to correction or modification";

(2) That if the information be published, the note shall also be published;

(3) That a copy be kept of the information supplied, to be forwarded to the Meteorological Office if required.

If arrangement is made for the payment of the custodian for this service the Director must be informed.

In cases in which the extraction of provisional information is permitted, instructions for observing or tabulating will be given to the custodian, which must be strictly followed.

## I.—OBSERVATORIES AND STATIONS IN CONNEXION WITH THE METEOROLOGICAL OFFICE.

### CENTRAL OBSERVATORY.

Kew Observatory, Old Deer Park, Richmond, Surrey.

*Superintendent:* C. Chree, LL.D., Sc.D., F.R.S., *Assistant Director of Observatories.*

Telegraphic Address: "Weather, Richmond, Surrey."

### MAGNETIC OBSERVATORY.

Eskdalemuir Observatory, Langholm.

*Superintendent:* G. W. Walker, M.A.

### WESTERN OBSERVATORY.

Valencia Observatory, Cahirciveen, Ireland.

*Superintendent:* J. E. Cullum.

Kew Observatory was built in 1769 as a private observatory and an astronomical and physical laboratory for King George III. The building was placed at the disposal of the British Association in 1842 and taken over by the Royal Society of London in 1871. The Observatory formed a department of the National Physical Laboratory from 1900 to 1910, and passed under the management of the Meteorological Office from July 1, 1910. Besides the work of a normal meteorological observatory (station of the first order of the international classification), the observatory undertakes experimental and research work in Meteorology, including Atmospheric Electricity, Terrestrial Magnetism, and Seismology.

Eskdalemuir Observatory was established by Government to continue the work of recording the magnetic elements which had been carried on at Kew Observatory and had been disturbed by electric tramways. It was opened in 1908. The work of the observatory includes routine work and experimental research in Terrestrial Magnetism, Atmospheric Electricity and Meteorology, as well as the maintenance of several Seismographs.

Valencia Observatory was established by the Meteorological Office in 1867 on Valencia Island. In 1891 it was transferred to Westwood House, Cahirciveen. Besides the work of a First Order Station and a Telegraphic Reporting Station, regular observations of magnetic force are made by arrangement with a committee organised by the late Earl of Rosse.

Other stations in connexion with the Office are shown in the list which follows on p. 82.

The returns from stations marked "𝔖" are supplied by the Scottish Meteorological Society, those marked "𝔐" by the Royal Meteorological Society. Stations marked respectively "S" or "M" are in connexion with the Societies as well as with the Office.

The list shows the order of classification of the stations and also the publication for which the returns are prepared in the Office. In specifying the order of the station a distinction has been drawn between eye observations and the records of autographic instruments. In general the returns received have formed the basis for the classification, but in cases in which more extensive observations are taken, but not forwarded to the Office, the corresponding symbol has been enclosed in brackets. The list makes no pretence to completeness in respect of these. The symbols used are explained as follows:—

I. Normal Meteorological Observatory: Station of the First Order.—Continuous records or hourly readings of pressure, temperature, wind, sunshine, and rain, with eye observations of the amount, form, and motion of the clouds, and notes on the weather. The autographic records are checked by frequent eye observations, and hence the symbol "I" has been entered in the table under both "Eye observations" and "Autographic."

II. Normal Climatological Station. Station of the Second Order.—Daily observations at 9 a.m. [3 p.m.] and 9 p.m. local time (or other accepted combinations of hours) of pressure, temperature (wet and dry-bulb), wind, amount of cloud, and weather, with the daily maximum and minimum of temperature, the daily rainfall, and remarks on the weather. Stations at which the additional observation at 3 p.m. is taken are distinguished by appending a suffix $_3$ to the symbol, thus—$II_3$.

III. Auxiliary Climatological Station: Station of the Third Order.—Observations similar in kind to those at the Normal Stations, but either (*a*) less full, (*b*) taken only once daily, (*c*) taken at hours other than 9 a.m. and 9 p.m.

T. Telegraphic Reporting Station.—Daily observations at 7 a.m., 1 p.m., and 6 p.m. G.M.T., similar in general character to those taken at Normal Climatological Stations, reported to the Office each day by telegraph. At some telegraphic stations an additional observation is taken at 9 p.m., and as the combination of hours 7 a.m., 1 p.m., 9 p.m. is accepted as suitable for stations of the Second Order of the international classification, these stations are distinguished by the two symbols T $\text{II}_3$.

- •. (Eye Observations.) Additional Rainfall Station.—Daily observations, generally at 9 a.m., of the amount of rainfall.
- ↗. Additional Anemograph Station.—Continuous records of wind velocity (force) and, in most cases, also of wind direction.
- B. Additional Barograph Station. — Continuous record of atmospheric pressure.
- Θ. Additional Thermograph Station.—Continuous record of atmospheric temperature.
- ●. (Autographic.) Additional Autographic Rain-gauge Station.—Continuous record of rainfall.
- H. Hygrograph Station.—Continuous record of the relative humidity of the air.
- ☉. Sunshine Station.—Continuous record of bright sunshine taken with a Campbell-Stokes recorder.
- K. Kite or Balloon Station.—Records of Temperature, Humidity and Wind in the upper air.

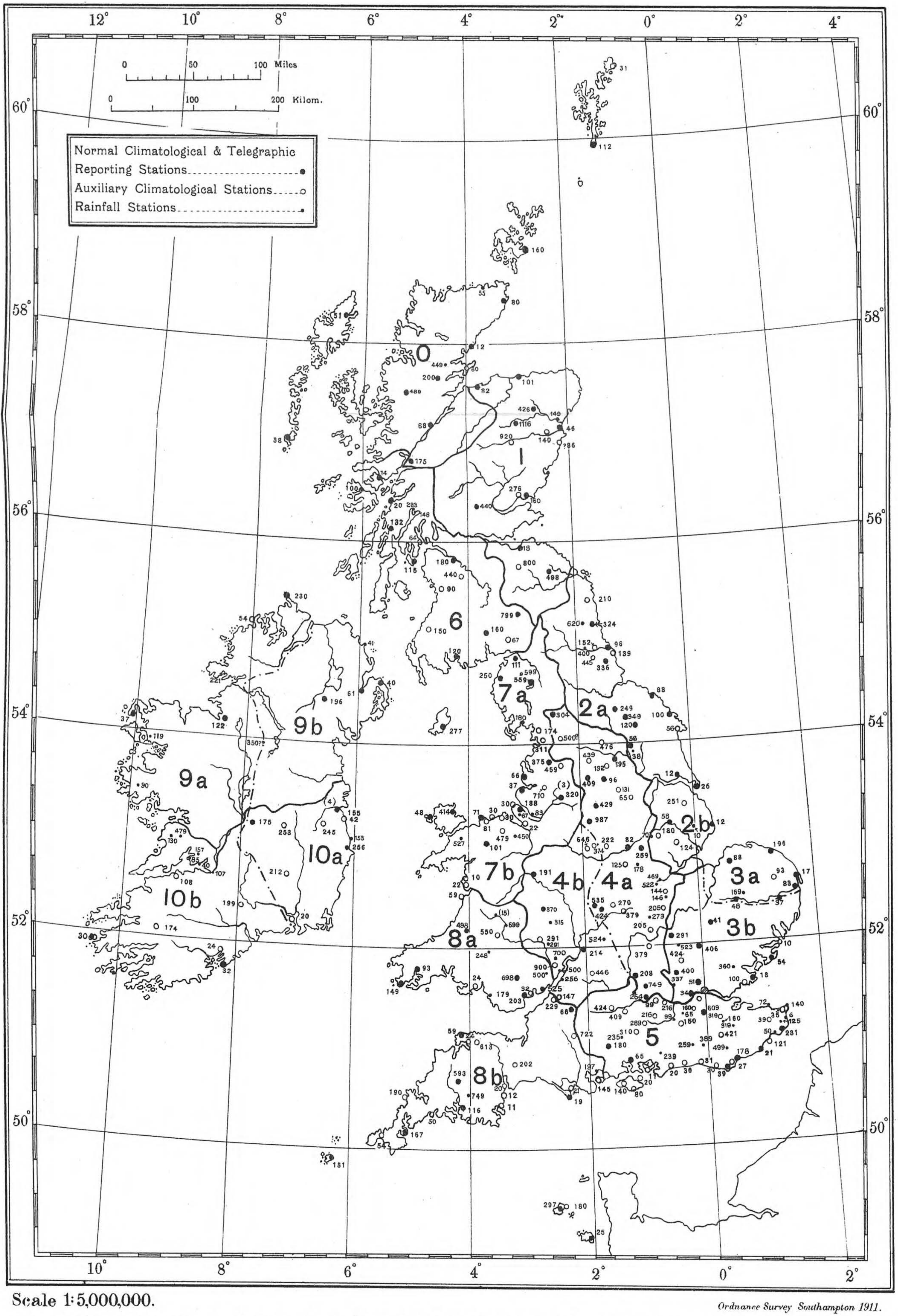
The publications for which the returns are prepared are indicated by the following letters :—

- D. Published *in extenso* in the "Daily Weather Report."
- d. Published in abridged form in the "Daily Weather Report."
- W. Weekly summary of temperature and rainfall and, if available, of sunshine, published in the "Weekly Weather Report."
- w. Weekly summary of bright sunshine only, or of grass minimum, or earth temperatures, or of observations in the upper air, published in the "Weekly Weather Report."
- M. Full monthly summary in the international form published in the "Monthly Weather Report."
- m. Abridged monthly summary published in the "Monthly Weather Report."
- (m.) Monthly totals of bright sunshine only or of rainfall only, published in the "Monthly Weather Report."
- S. Daily values published in "Daily Readings at Stations of the First and Second Orders" (1911).
- R. Monthly summary published in the Reports of the Registrar General of Births, Deaths, and Marriages for England and Wales, or for Ireland.
- r. Weekly summary published in the Reports of the Registrar General for England and Wales, or for Ireland.
- ↗. Daily summary of anemometer results certain of which are published in "Daily Readings at Stations of First and Second Orders" or in the "Geophysical Journal."

Fig. 11 between pp 80 and 81.

# REPORT OF THE METEOROLOGICAL COMMITTEE 1910-1911.

## Map showing Positions of Climatological Stations.



12°
10°
8°
6°
4°
2°
0°
2°
4°
60°
58°
56°
54°
52°
50°
0 50 100 Miles
0 100 200 Kilom.
Normal Climatological & Telegraphic Reporting Stations ●
Auxiliary Climatological Stations ○
Rainfall Stations •
0
1
2a
2b
3a
3b
4a
4b
5
6
7a
7b
8a
8b
9a
9b
10a
10b
10°
8°
6°
4°
2°
0°
2°

**Scale 1:5,000,000.**

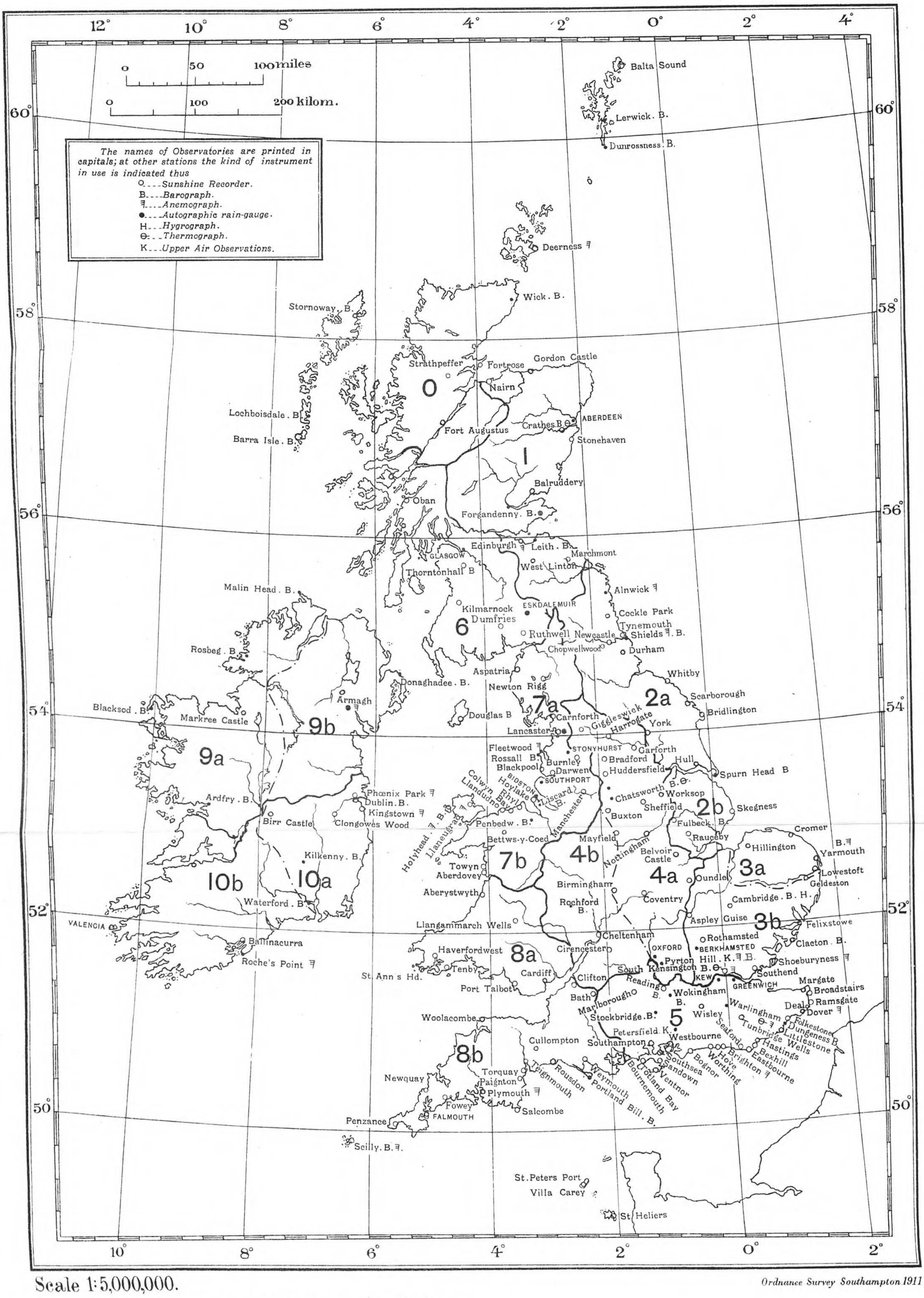
*Ordnance Survey Southampton 1911.*

*The heights of the stations above Mean Sea Level are inserted against the positions, and will serve to identify the names of the stations as given in the List of Stations on pp.*

Fig.12 to face Fig.11.

## REPORT OF THE METEOROLOGICAL COMMITTEE 1910-1911

### Map showing the Positions of the Stations having Self-Recording Instruments.


12°
10°
8°
6°
4°
2°
0°
2°
4°
60°
58°
56°
54°
52°
50°
0
50
100 miles
0
100
200 kilom.
The names of Observatories are printed in capitals; at other stations the kind of instrument in use is indicated thus
O....Sunshine Recorder.
B....Barograph.
ㅋ....Anemograph.
●....Autographic rain-gauge.
H....Hygrograph.
ϴ....Thermograph.
K....Upper Air Observations.
Balta Sound
Lerwick. B.
Dunrossness. B.
Deerness ㅋ
Wick. B.
Stornoway. B.
Strathpeffer
Fortrose
Gordon Castle
Nairn
0
Lochboisdale. B
Barra Isle. B
Fort Augustus
Crathes B ϴ
ABERDEEN
Stonehaven
1
Balruddery
Oban
Forgandenny. B.
Edinburgh ㅋ
Leith. B
Marchmont
GLASGOW
West Linton
Thorntonhall B
Alnwick ㅋ
Malin Head. B.
Kilmarnock
ESKDALEMUIR
Dumfries
Cockle Park
6
Tynemouth
Ruthwell
Newcastle
Shields ㅋ. B.
Rosbeg. B
Chopwellwood
Durham
Aspatria
Whitby
Donaghadee. B.
Newton Rigg
2a
Scarborough
Armagh
7a
Bridlington
Blacksod. B
Douglas B
Carnforth
Giggleswick
Harrogate
York
Markree Castle
9b
Lancaster
Fleetwood ㅋ
STONYHURST
Garforth
9a
Rossall B.
Bradford
Hull
Blackpool
Burnley
Huddersfield
Spurn Head B
Darwen
SOUTHPORT
Colwyn Bay
BIDSTON
Hoylake
Llandudno
Rhyl
Liscard B.
Manchester
B. ϴ.
Chatsworth
Worksop
Phœnix Park ㅋ
Ardfry. B.
Dublin. B.
Sheffield
2b
Skegness
Kingstown ㅋ
Buxton
Birr Castle
Clongowes Wood
Holyhead. B.
Llaneugrad
Penbedw. B.
Fulbeck. B
Bettws-y-Coed
Mayfield
Rauceby
Cromer
Nottingham
B. ㅋ
Kilkenny. B.
Hillington
Yarmouth
7b
4b
Belvoir Castle
Towyn
3a
10b
10a
Aberdovey
4a
Oundle
Lowestoft
Geldeston
Birmingham
Aberystwyth
Cambridge. B. H.
Waterford. B.
Coventry
Rochford B.
52°
VALENCIA
Llangammarch Wells
Aspley Guise
3b
Felixstowe
Ballinacurra
Cheltenham
Rothamsted
Haverfordwest
8a
Cirencester
OXFORD
BERKHAMSTED
Clacton. B.
Roche's Point ㅋ
Pyrton Hill. K. ㅋ. B.
Shoeburyness ㅋ
Tenby
South Kensington B. ϴ
St. Ann's Hd.
Cardiff
Clifton
KEW
Southend
Reading B.
GREENWICH
Margate
Port Talbot
Bath
Wokingham B.
Broadstairs
Marlborough
Ramsgate
Deal
Woolacombe
Stockbridge. B.
5
Wisley
Warlingham ϴ ㅋ
Dover ㅋ
Folkestone
Dungeness B
Petersfield. K.
Westbourne
Tunbridge Wells
Littlestone
Cullompton
Southampton
Seaford
Hastings
Bexhill
8b
Brighton ㅋ
Eastbourne
Hove
Worthing
Bognor
Southsea
Sandown
Ventnor
Totland Bay
Bournemouth
Weymouth
Portland Bill. B.
Rousdon
Teignmouth
Torquay
Paignton
Newquay
Plymouth ㅋ
Fowey
FALMOUTH
Salcombe
Penzance
Scilly. B. ㅋ.
St. Peters Port
Villa Carey
St. Heliers
10°
8°
6°
4°
2°
0°
2°

Scale 1:5,000,000.

Ordnance Survey Southampton 1911.

*The Stations in the London District are not all shown.*

**Height above Mean Sea Level.**—The figures given in this column refer in general to the height of the ground on which the rain-gauge stands. At those stations which do not possess a rain-gauge, the figures refer to the height of the particular instrument in use.

The positions of the climatological and rainfall stations may be identified on the map, Fig. 11, p. 80, from the figures which give their heights above Mean Sea Level, as shown in the following list.

⁂ From a number of stations in the British Isles printed summaries of observations are received. These have been included in the Geographical list of Institutions, &c., which issue publications (Appendix VII. to the Annual Report of the Meteorological Committee).

The following make monthly returns in a form similar to that in which observations are received from the normal or auxiliary climatological stations :—

Bolton.—The Museums and Meteorological Observatory.
Croydon.—Natural History Society.
Northampton.—Natural History Society.
Truro.—Cornwall County Council Sanitary Committee.

## List of Stations arranged according to Districts and Counties.

The Counties are grouped in Districts which are numbered as follows :—

- 0. Scotland, N. { (*a*) Islands. (*b*) Mainland.
- 1. Scotland, E.
- 2. England, N.E. { (*a*) Northern Part. (*b*) Southern Part.
- 3. England, E. { (*a*) Northern Part. (*b*) Southern Part.
- 4. Midland Counties { (*a*) Eastern Part. (*b*) Western Part.
- 5. England, S.E. London County.
- 6. (*a*) Scotland, W., and (*b*) Isle of Man.
- 7. (*a*) England, N.W., and (*b*) North Wales.
- 8. (*a*) South Wales and (*b*) England, S.W.
- 9. Ireland, N. { (*a*) Western Part. (*b*) Eastern Part.
- 10. Ireland, S. { (*a*) Eastern Part. (*b*) Western Part.
- 11. English Channel (Western Section).

| County and Station | Lat. | Long. | Height in feet above M.S.L. | Order of Station. | | Publication. | Year of last Inspection. | Observer. |
|---|---|---|---|---|---|---|---|---|
| | | | | Eye Obs. | Autographic. | | | |
| **0. SCOTLAND, NORTH.*** | | | | | | | | |
| (a.) *Islands.* | | | | | | | | |
| **Hebrides :—** Castlebay, Barra Isle ... | 56° 57′ | 7° 29′ W. | 38 | $\text{T II}_3$ | B ⊙ | D.W.M. | 10 | J. Smith, for M.O. |
| Glendrynoch, Skye ... | 57 18 | 6 17 W. | — | ● | — | — | — | Rev. H. Harbord. |
| Stornoway ... ... | 58 11 | 6 22 W. | 51 | $\text{T II}_3$ | B ⊙ | D.W.M. | 10 | W. Grant, for M.O. |
| **Shetlands :—S.** Baltasound ... ... | 60 44 | 0 48 W. | 31 | III | ⊙ | W.m. | 10 | J. Edmonston Saxby, F.R.C.S., Ed. |
| Lerwick ... ... | 60 9 | 1 8 W. | — | — | B | — | 09 | G. Gray, Harbour Master. |
| Lerwick ... ... | 60 9 | 1 8 W. | 54 | $\text{T II}_2$ | B | D.W.M. | 11 | Coastguard, for M.O. |
| Sumburgh Head ... | 59 51 | 1 17 W. | 112 | $\text{T II}_3$ | B | D.W.M. | 10 | Rev. W. Brand, for M.O. |
| **Orkney :—** Deerness ... ... | 58 56 | 2 45 W. | 160 | II | ➶ ⊙ | w.M.S. | 10 | M. Spence. |
| (b.) *Mainland.* | | | | | | | | |
| **Caithness :—** Sandside, Reay ... | 58 34 | 3 48 W. | 55 | ● | — | — | — | Nicol McNicol. |
| Wick ... ... ... | 58 27 | 3 6 W. | 81 | $\text{T II}_2$ | B | D.W.M. | 11 | Coastguard, for M.O. |
| **Cromarty :—** Strathpeffer Spa ... | 57 37 | 4 28 W. | 200 | II | ⊙ | W.M.d. | 08 | N. McLean, for H. W. Kaye, B.A., M.B. |
| **Inverness :—** §Fort Augustus ... | 57 8 | 4 40 W. | 68 | II | ⊙ | W.M. | 07 | Rev. C. von Dieckhoff, O.S.B. and Rev. Ambrose Geoghegan, O.S.B. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | §Fort William ... ... | 56 49 | 5 7 W. | 175 | II | — | W.M.S. | 10 | W. T. Kilgour. |
| | §Kingussie ... ... | 57 5 | 4 2 W. | 822 | II | — | M. | — | W. de Watteville, M.D. |
| | Lochboisdale ... ... | 57 10 | 7 20 W. | — | — | B | — | — | Arch. Maclennan. |
| **Ross** :— | Ardross Castle ... ... | 57 45 | 4 21 W. | 449 | ● | — | — | — | W. Laing Minty. |
| | S. Fortrose ... ... | 57 35 | 4 8 W. | 80 | III | ⊙ | — | 10 | Archd. Thom, M.A. |
| | §Glencarron ... ... | 57 30 | 5 14 W. | 489 | II | — | W.M. | 10 | D. D. Munro. |
| | Kinlochewe ... ... | 57 36 | 5 24 W. | — | ● | — | — | — | A. McLennan, for Hon. W. Peel, M.P. |
| **Sutherland** :— | §Dunrobin Castle ... | 57 59 | 3 56 W. | 12 | II | — | M. | 09 | D. Melville, for the Duke of Sutherland, K.G. |
| **1. SCOTLAND, EAST.** | | | | | | | | | |
| **Aberdeen** :— | Aberdeen Observatory | 57 10 | 2 6 W. | 46 | I, T | I, B | D.W.M.S. | 10 | Professor C. Niven, F.R.S., and G. A. Clarke, for M.O. |
| | §Balmoral ... ... | 57 2 | 3 12 W. | 920 | III | — | W.M. | 08 | J. Michie, M.V.O., and John M. Troup. |
| | Dyce ... ... ... | 57 13 | 2 10 W. | 149 | ● | — | — | — | James E. Crombie, LL.D. |
| | Insch ... ... ... | 57 20 | 2 37 W. | 426 | II | ⊙ | m. | — | J. Bisset. |
| | §*Tillypronie* ... ... | 57 10 | 2 56 W. | 1,116 | II | — | M. | 09 | Robert Littlejohn, for the late Sir John F. Clark, Bart. |
| **Banff** :— | §Gordon Castle ... ... | 57 37 | 3 5 W. | 101 | II | ⊙ | W.M. | 08 | C. Webster, for the Duke of Richmond and Gordon, K.G. |
| **Berwick** :— | §Marchmont ... ... | 55 44 | 2 25 W. | 498 | II | ⊙ | W.M. | 10 | J. A. Wood, for Sir J. H. Hume Campbell, Bart. |
| **Clackmannan** :— | No station. | | | | | | | | |
| **Edinburgh** :— | Edinburgh, Royal Observatory. | 55 57 | 3 12 W. | 441 | — | ↗ | — | — | The Astronomer Royal. |
| | *Edinburgh, Royal Botanic Garden.* | 55 57 | 3 12 W. | 253 | — | ⊙ | w.(m.) | — | The Regius Keeper. |
| | Leith ... ... ... | 55 58 | 3 10 W. | 18 | T | B | D.W.M. | 10 | D. Drummond, Post Office, for M.O. |
| **Elgin** :— | No station. | | | | | | | | |
| **Fife** :— | No station. | | | | | | | | |
| **Forfar** :— | S. Balruddery ... ... | 56 29 | 3 8 W. | 276 | III | ⊙ | w.m. | 10 | G. Davie, for J. Martin White. |
| | §Dundee ... ... ... | 56 28 | 2 56 W. | 160 | II | — | M.S. | 09 | J Carnochan. |
| **Haddington** :— | No station. | | | | | | | | |

* *Note.*—The parts of this district forming section (*a*) Islands, include the Shetlands, the Orkneys, and the Hebrides. The latter form part of the counties Inverness and Ross.

The names of Stations added to the list since April, 1910, are printed in clarendon type. The positions of the Stations can be identified on the map, Fig. 11, p. 80, from the figures which give their heights above Mean Sea Level.

LIST OF STATIONS ARRANGED ACCORDING TO DISTRICTS AND COUNTIES—*continued.*

| County and Station. | | Lat. | Long. | Height in feet above M.S.L. | Order of Station. | | Publication. | Year of last Inspection. | Observer. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Eye Obs. | Autographic. | | | |
| **1. SCOTLAND, EAST**—*cont.* | | | | | | | | | |
| **Kincardine :—** | S. Crathes ... ... ... | 57° 3' | 2° 25' W. | 140 | III | ⊙ θ B | w.m. | 08 | J. Smith. |
| | Stonehaven ... ... | 56 58 | 2 13 W. | 786 | III | ⊙ | d.m. | 08 | J. Hart, for Town Clerk. |
| **Kinross :—** | No station. | | | | | | | | |
| **Linlithgow :—** | No station. | | | | | | | | |
| **Nairn :—** | Nairn ... ... ... | 57 36 | 3 52 W. | 82 | T | ⊙ | D.W.M. | 10 | Miss Penny, for M.O. and Medical Officer of Health. |
| **Peebles :—** | S. West Linton ... ... | 55 45 | 3 4 W. | 800 | III | ⊙ | W.m. | 08 | Rev. J. S. Begg. |
| **Perth :—** | **S**Crieff ... ... ... | 56 22 | 3 50 W. | 440 | II | — | W.M. | 10 | George Reid, for Dr. Meikle. |
| | Forgandenny ... ... | 56 21 | 3 29 W. | 175 | — | B ● | — | — | Miss Frances Wood. |
| **Roxburgh :—** | No station. | | | | | | | | |
| **Selkirk :—** | No station. | | | | | | | | |
| **2. ENGLAND, NORTH EAST.** | | | | | | | | | |
| (a) *Northern Part.* | | | | | | | | | |
| **Durham :—** | Chopwellwood ... | 54 55 | 1 47 W. | 445 | III | ⊙ | m. | — | J. F. Annand. |
| | Durham ... ... | 54 46 | 1 35 W. | 336 | II | ⊙ | W.M.R. | 09 | Prof. R. A. Sampson, M.A., F.R.S., and F. C. H. Carpenter. |
| | *Seaham Harbour* ... | 54 50 | 1 19 W. | 139 | II | — | M. | 10 | G. H. Aird. |
| **Northumberland :—** | Alnwick Castle ... | 55 25 | 1 43 W. | 210 | III | ➴ | W.m. | 10 | Robert Kyle, for the Duke of Northumberland, K.G. |
| | Cockle Park, Morpeth | 55 13 | 1 41 W. | 324 | II | ⊙ | w.M.S.R. | 09 | T. E. W. Dobson, for the Northumberland County Council. |
| | Font Watershed, Dam Site. | 55 14 | 1 54 W. | 620 | ● | — | — | — | H. G. Coventry, C.E., for the Corporation of Tynemouth. |
| | Heddon-on-the-Wall ... | 55 0 | 1 47 W. | 400 | ● | — | — | — | Rev. W. G. Pringle. |
| | Newcastle-on-Tyne ... | 54 59 | 1 36 W. | 152 | III | ⊙ | w.m | 10 | N H. Martin, F.R.S.E., F.C.S. |
| | North Shields ... | 55 0 | 1 27 W. | 96 | T | B | D.W.M..R.r. | 10 | R. Moat, Post Office, for M.O. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *North Shields High Lighthouse* | 55 0 | 1 27 W. | — | — | 〃 | 〃 | 10 | *The late* Capt. T. Robson, for M.O. |
| | Tynemouth ... ... | 55 1 | 1 26 W. | 90 | $II_3$ | ⊙ | d. | 09 | J. Edward Burnett. |
| **Yorkshire, N. Riding :—** | Ampleforth ... ... | 54 12 | 1 6 W. | 349 | II | — | m. | 09 | Rev. T. I. Barton, O.S.B., and Rev. R. C. Hesketh, O.S.B. |
| | Hovingham Hall ... | 54 10 | 0 59 W. | 120 | ● | — | — | — | Bingley Day, for Sir W. H. A. Worsley, Bart. |
| | 𝔐Rounton ... ... | 54 24 | 1 18 W. | 249 | II | — | W.M. | 08 | J. Hanagan, for Sir Hugh Bell, Bart. |
| | M. Scarborough ... ... | 54 18 | 0 24 W. | 100 | II | ⊙ | d.W.M. | 10 | John Knight, M.D., D.P.H., for the Corporation. |
| | Whitby ... ... | 54 29 | 0 37 W. | 88 | II | ⊙ | M. | 10 | Thos. Newbitt, for the Literary and Philosophical Society. |
| | York. Deighton Grove | 53 54 | 1 3 W. | 38 | ● | — | — | 05 | Miss M. L. Whitehead. |
| | „ The Museum ... | 53 57 | 1 5 W. | 56 | II | — | W.M.R.r. | 10 | Oxley Grabham, M.A., for the Yorkshire Philosophical Society. |
| | „ Bootham ... | 53 57 | 1 5 W. | 105 | — | ⊙ | | 07 | Hugh Richardson, M.A. |
| **Yorkshire, E. Riding :—** | Bridlington (Grammar School). | 54 5 | 0 13 W. | 56 | III | (B) ⊙ | — | 08 | A. Thornton, M.A. |
| | Hull ... ... ... | 53 45 | 0 16 W. | 12 | II | ⊙ | M.R.r.w. | 08 | H. B. Witty, for the Corporation. |
| | Spurn Head ... ... | 53 34 | 0 7 E. | 26 | T | B | D.W.M.R. | 10 | R. I. Comber, for M.O. |
| (b) *Southern Part.* | | | | | | | | | |
| **Lincolnshire :—** | Claypole ... ... | 53 2 | 0 46 W. | 70 | ● | — | — | — | Rev. F. Hamilton. |
| | Fulbeck ... ... | 53 3 | 0 37 W. | 180 | III | B ⊙ | W.m. | 10 | Rev. Vere F. Willson, M.A. |
| | Lincoln... ... ... | 53 14 | 0 33 W. | 58 | III | — | W.m.R. | 09 | W. Barr, for the Corporation. |
| | Mareham-le-Fen ... | 53 8 | 0 5 W. | 10 | ● | — | — | 01 | Mrs. G. L. Kime. |
| | Rauceby Hall ... ... | 53 0 | 0 29 W. | 124 | III | ⊙ | w.m. | 09 | J. Hope, for General Sir M. Willson, K.C.B. |
| | Skegness ... ... | 53 9 | 0 21 E. | 12 | III | ⊙ | d.w.M. | 10 | S. Coetmore Jones, for the District Council. |
| | *Tealby* ... ... ... | 53 24 | 0 16 W. | 251 | II | — | m. | 09 | Rev. S. Lewin, B.A. |
| | Temple Bruer ... ... | 53 4 | 0 30 W. | — | ● | — | — | 03 | Miss Alice S. Morley. |

The names of Stations added to the list since April, 1910, are printed in clarendon type. The positions of the Stations can be identified on the map, Fig. 11, p. 80, from the figures which give their heights above Mean Sea Level.

## LIST OF STATIONS ARRANGED ACCORDING TO DISTRICTS AND COUNTIES—*continued.*

| County and Station. | | Lat. | Long. | Height in feet above M.S.L. | Order of Station. | | Publication. | Year of last Inspection. | Observer. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Eye Obs. | Autographic. | | | |
| **3. ENGLAND, EAST.** | | | | | | | | | |
| (a) *Northern Part.* | | | | | | | | | |
| **Norfolk :—** | Cromer ... ... ... | 52° 56′ | 1° 17′ E. | 196 | II | ⊙ | W.M.R. | 10 | W. H. Archer, for Urban District Council. |
| | Geldeston ... ... | 52 28 | 1 31 E. | 37 | II | ⊙ (B θ) | W.M. | 09 | E. T. Dowson. |
| | 𝔐Hillington ... ... | 52 48 | 0 33 E. | 88 | II | ⊙ | W.M.R. | 08 | Rev. H. E. B. Ffolkes, M.A. |
| | M. Norwich ... ... | 52 37 | 1 17 E. | 93 | III | — | W.R.r.m. | 08 | A. W. Preston. |
| | Thetford ... ... | 52 25 | 0 45 E. | 169 | ● | — | — | — | E. S. Greenwood, for Town Council. |
| | Yarmouth ... ... | 52 37 | 1 43 E. | 17 | T, II$_3$ | B ➹ ⊙ | D.W.M. | 10 | Coastguard, for M.O. and for Corporation. |
| | „ Gorleston ... | 52 35 | 1 43 E. | 10† | — | ➹ | — | 10 | |
| (b) *Southern Part.* | | | | | | | | | |
| **Bedford :—** | Aspley Guise ... ... | 52 1 | 0 38 W. | 410 | — | ⊙ | m. | — | Mrs. Dymond. |
| | Woburn, Ridgmont ... | 52 1 | 0 36 W. | 291 | II | — | M. | 08 | H. M. Freear, F.C.S., for the Royal Agricultural Society. |
| **Cambridge :—** | Cambridge Bot. Garden | 52 12 | 0 8 E. | 41 | II | ⊙ | W.M.S.R. | 10 | R. Irwin Lynch, M.A. |
| | „ The Observatory. | 52 13 | 0 6 E. | 83 | — | B | — | 05 | A. R. Hinks, M.A., for Sir Robert Ball, F.R.S. |
| | „ Newnham Coll. | 52 13 | 0 5 E. | — | III | H | — | 10 | Miss Stephen. |
| **Essex :—** | Clacton-on-Sea... ... | 51 47 | 1 9 E. | 54 | T, II$_3$ | ⊙ B | D.W.M.R. | 10 | A. W. Shadick, for Urban District Council. |
| | Shoeburyness ... ... | 51 32 | 0 47 E. | 13* | III | ➹ | W.m. | 09 | The Superintendent of Experiments. |
| | Southend-on-Sea ... | 51 32 | 0 43 E. | 90 | III | ⊙ | w.m. | 10 | E. J. Elford, for the Corporation. |
| | „ Waterworks | 51 32 | 0 43 E. | 110 | ● (8) | — | — | 10 | E. C. Bilham. |
| | Stifford ... ... | 51 30 | 0 18 E. | 73 | ● | — | — | — | Miss A. L. Scott. |
| **Hertford :—** | 𝔐Bennington ... ... | 51 54 | 0 5 W. | 406 | II | — | M.R. | 09 | Rev. J. Dunne Parker, LL.D. |
| | 𝔐Berkhamsted ... ... | 51 46 | 0 34 W. | 400 | II | ⊙ (I) | M.R. | 09 | E. Mawley. |
| | Offley Vicarage ... | 51 56 | 0 21 W. | 523 | ● | — | — | — | Rev. E. P. Gatty. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Rothamsted ... ... | 51 48 | 0 22 W. | 424 | III | ⊙ | W.m. | 09 | A. D. Hall, M.A., for the Lawes Agricultural Trust. |
| **Huntingdon :—** | No station. | | | | | | | | |
| **Middlesex :—** | Harefield ... ... | 51 36 | 0 29 W. | 337 | ● | — | — | — | G. Eland. |
| **Suffolk :—** | Brandon ... ... | 52 27 | 0 37 E. | 48? | ● | — | — | — | Lt.-Col. B. Spragge, D.S.O. |
| | Felixstowe ... ... | 51 58 | 1 22 E. | 10 | III | ⊙ | d.W.m. | 10 | F. B. Jennings, for the District Council. |
| | 𝔐Lowestoft ... ... | 52 29 | 1 45 E. | 83 | II | ⊙ | w.d.M. | 08 | C. W. Edwards, for the Corporation. |
| **4. MIDLAND COUNTIES.** | | | | | | | | | |
| (a) *Eastern Part.* | | | | | | | | | |
| **Buckingham :—** | Beaconsfield ... ... | 51 36 | 0 38 W. | 360 | ● | — | — | — | C. T. Marcon, M.A. |
| | **High Wycombe** ... | 51 37 | 0 45 W. | | III | — | — | — | R. O. Matthews. |
| | Winslow ... ... | 51 57 | 0 53 W. | 379 | III | — | m. | 10 | R. A. Easton. |
| **Derby :—** | Belper ... ... ... | 53 1 | 1 29 W. | 222 | III | — | m. | — | W. W. Tunnicliffe, B.Sc., F.C.S. |
| | M. Buxton ... ... ... | 53 16 | 1 55 W. | 987 | $II_3$ | ⊙ (B) | d.W.M.R. | 08 | W. Pilkington, and F. T. Kieldsen. |
| | Chatsworth ... ... | 53 14 | 1 37 W. | — | III | B θ | — | 02 | J. P. Cockerell, *for* The Duke of Devonshire, K.G. |
| | **Derby** ... ... ... | | | 208 | — | B | — | — | John Stretton. |
| **Leicester :—** | Belvoir Castle ... ... | 52 54 | 0 47 W. | 259 | II | ⊙ | R.M. | 09 | W. H. Divers, for the Duke of Rutland, K.G. |
| | Syston ... ... ... | 52 43 | 1 5 W. | 178 | ● | — | — | 96 | S. K. Daniels. |
| **Northampton :—** | Great Billing ... ... | 52 16 | 0 50 W. | 273 | ● | — | — | — | Rev. G. H. Mullins, M.A. |
| | Oundle (The School)... | 52 29 | 0 28 W. | 144 | III | ⊙ | — | 04 | F. H. E. Martin and Percy Evans, *for* F. W. Sanderson, M.A., Headmaster. |
| | „ ... ... | 52 29 | 0 28 W. | 146 | ● | — | — | 04 | N. E. Dixon, C.E. |
| | 𝔐Raunds ... ... ... | 52 22 | 0 33 W. | 205 | III | — | W.m. | 08 | Leon G. H. Lee. |
| **Nottingham :—** | Bawtry, Hesley Hall ... | 53 27 | 1 4 W. | 65 | III | — | W.m. | 09 | B. I. Whitaker, J.P. |
| | Kingston-on-Soar ... | 52 51 | 1 14 W. | 125 | III | —† | m. | 08 | Fred Wakerly. |
| | Nottingham ... ... | 52 56 | 1 9 W. | 82 | T, $II_3$ | ⊙ (⸗ B ●) | D.W.M.R.r. | 09 | Arthur Brown, M.Inst.C.E., and Philip Boobbyer, M.D., for the Corporation. |
| | 𝔐Worksop (Hodsock) ... | 53 22 | 1 5 W. | 56 | III | ⊙ (B ●) | w.m. | 08 | Lt.-Col. H. Mellish, J.P. |

The names of Stations added to the list since April, 1910, are printed in clarendon type. The positions of the Stations can be identified on the map, Fig. 11, p. 80, from the figures which give their heights above Mean Sea Level.

* Head of Anemometer 103 ft. above M.S.L. † Head of Anemometer 52 ft. above M.S.L.

## LIST OF STATIONS ARRANGED ACCORDING TO DISTRICTS AND COUNTIES—*continued.*

| County and Station | | Lat. | Long. | Height in feet above M.S.L. | Order of Station. | | Publication. | Year of last Inspection. | Observer. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Eye Obs. | Autographic. | | | |
| **4. MIDLAND COUNTIES**—*cont.* | | | | | | | | | |
| (a) *Eastern Part*—cont. | | | | | | | | | |
| **Oxford :—** | Oxford ... ... ... | 51° 46′ | 1° 16′ W. | 208 | [I] T | ⊙ [I] | D.W.M.R. | 10 | Dr. A. A. Rambaut, M.A., F.R.S.; W. Wickham, for M.O. |
| | Pyrton Hill ... ... | 51 38 | 1 1 W. | 500 | — | K ✒ B | w. | — | W. H. Dines, F.R.S., for M.O. |
| **Rutland :—** | Ridlington ... ... | 52 37 | 0 45 W. | 522 | ● | — | — | — | N. W. Wortley. |
| | Uppingham ... ... | 52 38 | 0 43 W. | 469 | III | — | — | — | E. Hunter. |
| **Warwick :—** | Coventry ... ... | 52 25 | 1 30 W. | 270 | III | ⊙ | R.m. | 10 | E. Hugh Snell, M.D., for the Corporation. |
| | Rugby School ... ... | 52 22 | 1 15 W. | 379 | II | (B) | m. | 08 | Rev. D. E. Shorto, M.A. |
| | Birmingham, Edgbaston | 52 28 | 1 56 W. | 535 | II | ⊙ | d.W.M.R.r. | 10 | Alfred Cresswell, for the Midland Institute. |
| | „ Hagley Road | 52 28 | 1 58 W. | 612 | ● | — | — | — | Henry E. Stilgoe, M. Inst., C.E. |
| **Yorkshire, W. Riding :—** | Bradford ... ... | 53 49 | 1 46 W. | 439 | III | ⊙ | m.r. | 09 | H. Lander for the Corporation. |
| | Garforth ... ... | 53 48 | 1 22 W. | 195 | II | ⊙ | M. | 09 | Prof. Seton, B.Sc., for the University of Leeds. |
| | Giggleswick ... ... | 54 4 | 2 17 W. | 500? | III | (B) ⊙ | — | 05 | C. F. Mott, M.A. |
| | M. Harrogate ... ... | 54 0 | 1 33 W. | 476 | III | ⊙ | d.W.m. | 08 | C. E. Rivers, for the Corporation. |
| | Huddersfield ... ... | 53 39 | 1 47 W. | 409 | II$_3$ | ⊙ (●) | M.R.r. | 09 | J. Firth, Registrar, for the Corporation. |
| | Leeds ... ... ... | 53 48 | 1 33 W. | 132 | III | (B) | — | 08 | H. Crowther, for the Leeds Philosophical Society. |
| | Sheffield ... ... | 53 23 | 1 29 W. | 429 | II | ⊙ | w.M.R. | 08 | E. Howarth, F.R.A.S. |
| | 𝔐Wakefield ... ... | 53 41 | 1 30 W. | 96 | II | — | M.R. | 08 | Alex. French, M.R.C.S., L.R.C.P. |
| (b) *Western Part.* | | | | | | | | | |
| **Gloucester :—** | 𝔐Cheltenham ... ... | 51 54 | 2 3 W. | 214 | II | ⊙ | M.R. | 09 | A. C. Saxby, for the Corporation. |
| | Cirencester ... ... | 51 43 | 1 57 W. | 446 | III | ⊙ | W.m. | 08 | Prof. M. Kershaw, B.A., for the Royal Agricultural College. |
| | Dursley ... ... ... | 51 41 | 2 21 W. | 256 | ● | — | — | 96 | E. Fryer Smith. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Forest of Dean :—** | | | | | | | | | | |
| | **Blakeney Hill** ... | 51 46 | 2 30 W. | 500 | ● | — | — | — | John Tyler | for V. F. Leese. |
| | **Braceland** ... ... | 51 49 | 2 38 W. | 500 | ● | — | — | — | E. P. Popert | |
| | **Edgehills Lodge** ... | 51 51 | 2 29 W. | 700 | ● | — | — | — | Campbell Anderson | |
| | **Ruardean Hill** ... | 51 50 | 2 32 W. | 900 | ● | — | m. | 05 | John Morris | |
| | **Whitemead Park** ... | 51 46 | 2 34 W. | 200 | ● | — | m. | 05 | William Morris | |
| | **Worcester Lodge** ... | 51 48 | 2 35 W. | 700 | ● | — | — | — | William Morris | |
| | Hidcote ... ... ... | 52 5 | 1 46 W. | 524 | ● | — | — | 97 | Major W. Wright, R.A. | |
| **Hereford:—** | **Bromyard** ... ... | 52 11 | 2 30 W. | 392 | II | — | — | — | T. V. Philpott, M.A. | |
| | 𝕸Hereford (Belmont) ... | 52 5 | 2 45 W. | 291 | III | — | W.m. | 10 | Canon T. B. Harrington, O.S.B. | |
| **Shropshire :—** | Shrewsbury ... ... | 52 43 | 2 45 W. | 191 | II | — | W.M.R.S. | 09 | Capt. C. S. Reid, R.E. | |
| | *Stokesay* ... ... | 52 26 | 2 52 W. | 370 | II | — | M.R. | 09 | Rev. W. M. D. La Touche, B.A. | |
| | **Wistanstow** ... ... | 52 28 | 2 50 W. | 484 | II | — | M.R. | — | Rev. W. M. D. La Touche, B.A. | |
| **Somerset :—** | Bath ... ... ... | 51 23 | 2 21 W. | 66 | T | B ⫽ ⊙ | D.W.M.R. | 09 | W. H. Symons, M.D., for the Corporation. | |
| **Stafford :—** | 𝕸Cheadle (Tean) ... | 52 58 | 1 57 W. | 646 | III | — | W.m. | 08 | Col. B. H. Philips. | |
| | Mayfield ... ... | 53 0 | 1 46 W. | 374 | III | (B ⫽) ⊙ | m. | 09 | G. C. Lawson. | |
| **Worcester :—** | Birmingham, Sparkhill | 52 27 | 1 52 W. | 424 | III | — | — | 10 | D. H. Owen. | |
| | Rochford ... ... | 52 18 | 2 36 W. | 315 | ● | B | — | 01 | Rev. John Tomson. | |
| **5. ENGLAND, SOUTH-EAST.** | | | | | | | | | | |
| **Berkshire :—** | Bucklebury Place .. | 51 26 | 1 24 W. | 409 | III | — | m. | 08 | J. W. Harris, for A. W. Sutton. | |
| | *Maidenhead* ... ... | 51 30 | 0 43 W. | 101 | III | — | m. | 10 | G. H. Palmer. | |
| | Reading (Leighton Park School). | 51 26 | 0 57 W. | 264 | II | B ⊙ | M. | 10 | C. I. Evans, Headmaster. | |
| | Wokingham ... ... | 51 23 | 0 48 W. | 216 | III | B | m. | 10 | Medical Superintendent of Sanatorium. | |
| **Hampshire :—** | Basingstoke ... ... | 51 16 | 1 6 W. | 289 | III | — | m. | 10 | A. M. Pitkin, F.R.G.S. | |
| | Bournemouth ... ... | 50 43 | 1 53 W. | 145 | III | ⊙ | d.w.m. | 08 | C. Dales, for Town Council. | |
| | Petersfield (Ditcham Park). | 51 0 | 0 57 W. | 550 | — | K | w. | — | C. J. P. Cave, M.A. | |
| | M. Portsmouth ... ... | 50 48 | 1 6 W. | 11 | III | — | R.r.w.m. | 10 | A. Mearns Fraser, M.D., for the Corporation. | |
| | M. Sandown ... ... | 50 48 | 1 8 W. | 20 | III | ⊙ (B) | m. | — | G. E. Gilchrist, for the Sandown Advancement Board. | |
| | Southampton ... ... | 50 55 | 1 24 W. | 65 | II | ⊙ | W.M.S.R. | 09 | A. Vaughan, for Director-General of Ordnance Survey. | |

The names of Stations added to the list since April, 1910, are printed in clarendon type. The positions of the Stations can be identified on the map, Fig. 11, p. 80, from the figures which give their heights above Mean Sea Level.

## List of Stations arranged according to Districts and Counties—*continued.*

| County and Station. | | Lat. | Long. | Height in feet above M.S.L. | Order of Station. | | Publication. | Year of last Inspection | Observer. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Eye Obs. | Autographic. | | | |
| **5. ENGLAND, SOUTH-EAST**—*cont.* | | | | | | | | | |
| **Hampshire**—*cont.* | Southsea ... ... | 50° 47′ | 1° 6′ W. | — | — | ⊙ | d. | 10 | A. Mearns Fraser, M.D., for the Corporation of Portsmouth. |
| | Stockbridge(Ashley) | 51 5 | 1 27 W. | 235 | ● | B | — | — | Legh S. Powell. |
| | 𝔐Swarraton ... | 51 8 | 1 11 W. | 310 | III | — | W.m. | 09 | Rev. W. L. W. Eyre, M.A. |
| | Totland Bay ... | 50 41 | 1 33 W. | 140 | III | ⊙ | m. | 10 | J. Dover, M.A. |
| | M. Ventnor ... ... | 50 36 | 1 13 W. | 80 | III | ⊙ | W.m.R. | 06 | Miss M. Gibson, for Royal National Hospital for Consumption. |
| **Kent**:— | Broadstairs ... | 51 21 | 1 26 E. | 140 | ● | ⊙ | (m.) | — | Howard Hurd, C.E., and Rev. H. C. V. Snowden, for District Council. |
| | Canterbury ... | 51 17 | 1 5 E. | 39 | III | — | w. | 05 | A. Lander. |
| | Deal ... ... | 51 13 | 1 24 E. | 23 | III | ⊙ | d. | 10 | S. Miller. |
| | Dover ... ... | 51 7 | 1 18 E. | 198 | ● | — | — | 96 | W. C. Hawke, C.E., for the Corporation of Dover. |
| | Dover ... ... | 51 7 | 1 19 E. | 231 | T | ⊙ ✒ | D.M. ✒ | 10 | |
| | Kearsney, Chilton Farm. | 51 8 | 1 17 E. | 125 | ● | — | — | — | |
| | Dungeness ... | 50 55 | 0 58 E. | 21 | T | B | D.W.M. | 10 | W. S. Wilder, Lightkeeper, for M.O. |
| | Folkestone ... | 51 5 | 1 11 E. | 121 | III | ⊙ (●) | d.m. | 08 | J. W. Stainer, for the Corporation. |
| | Hildenborough ... | 51 13 | 0 15 E. | 160 | ● | — | — | — | Charles H. Scott. |
| | Littlestone-on-Sea | 50 59 | 0 59 E. | — | — | ⊙ | d.w.(m.) | 05 | H. T. Tubbs. |
| | M. Margate ... ... | 51 24 | 1 24 E. | 35 | III | ⊙ | d.W.m. | 08 | J. Stokes, J.P., for the Corporation. |
| | Matfield ... ... | 51 9 | 0 22 E. | 319 | III | — | m. | 10 | D'Arcy Reeve. |
| | Ramsgate... ... | 51 20 | 1 25 E. | — | — | ⊙ | d.w.(m.) | 08 | T. G. Taylor, C.E., for the Corporation. |
| | Sandgate ... ... | 51 4 | 1 9 E. | 50 | ● | — | — | 99 | Chas. J. Conquest. |
| | Sandwich ... | 51 17 | 1 20 E. | 6 | ● | — | — | 03 | Royal St. George's Golf Club. |
| | Sevenoaks ... | 51 16 | 0 12 E. | 509 | III | — | m. | — | W. Tattersall. |
| | Tankerton ... | 51 22 | 0 2 E. | 72 | ● | — | — | — | F. Gaster. |
| | Tonbridge ... | 51 12 | 0 17 E. | 319 | ● | — | — | — | J. Waley Cohen. |
| | 𝔐Tunbridge Wells... | 51 8 | 0 16 E. | 421 | III | ⊙ | W.m. | 09 | F. G. Smart, M.B. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Surrey :—** | Byfleet ... ... | 51 20 | 0 29 W. | 65 | ● | — | — | — | R. W. Pretor-Pinney. |
| | Epsom ... ... | 51 20 | 0 17 W. | 160 | III | — | m. | — | S. C. Russell. |
| | Newdigate ... | 51 0 | 0 17 W. | 259 | ● | (B) | — | — | R. J. Wallis. |
| | Send ... ... | 51 15 | 0 32 W. | 99 | ● | (B) | — | — | J. W. G. Bond. |
| | Warlingham ... | 51 18 | 0 3 W. | 609 | ● | θ ⚑ | — | — | R. H. Curtis. |
| | Wisley ... ... | 51 17 | 0 26 W. | 150 | III | ⊙ | W.m. | 09 | The Superintendent, for the Royal Horticultural Society. |
| **Sussex :—** | Bexhill-on-Sea ... | 50 50 | 0 33 E. | 27 | II | ⊙ | d.m. | 08 | G. Brisley, M.P.S., for the Corporation. |
| | M. Bognor ... ... | 50 47 | 0 40 W. | 20 | III | ⊙ | d.w.m. | 10 | H. Gardner, for the Bognor Climatological Society. |
| | M. Brighton ... ... | 50 49 | 0 8 W. | 31 | III | ⚑ ⊙ | d.w.m.R.r. | 09 | H. Heasman, for the Medical Officer of Health. |
| | Brighton ... ... | 50 49 | 0 8 W. | 380 | — | K | w. | — | S. H. R. Salmon. |
| | Cuckfield ... ... | 51 1 | 0 9 W. | 389 | ● | — | — | 97 | E. Gosden. |
| | Eastbourne ... | 50 46 | 0 17 E. | 39 | II | ⊙ | d.w.M.R. | 08 | S. R. Henderson, for the Medical Officer of Health. |
| | Hastings Cemetery | 50 52 | 0 34 E. | 499 | ● | — | — | — | Walter Field. |
| | ,, Waterworks | 50 51 | 0 34 E. | 270 | — | ⊙ | d.w.(m.) | 06 | J. Farnham, for the Corporation. |
| | Heathfield ... | 50 58 | 0 16 E. | 499 | ● | — | — | — | J. F. Leigh Clare. |
| | Hove ... ... | 50 47 | 0 10 W. | — | — | ⊙ | m. | — | A. Griffith, M.O.H., for the Corporation. |
| | St. Leonards ... | 50 51 | 0 33 E. | 178 | II | — | W.M. | 08 | H. Colborne, M.R.C.S., for the Corporation. |
| | ,, West Marina | 50 51 | 0 32 E. | 207 | III | — | — | 06 | T. Eldridge, for the Corporation. |
| | Seaford ... ... | 50 46 | 0 6 E. | 30 | III | ⊙ | d. | 09 | Col. F. W. Savage, V.D. |
| | Watergate Park ... | 50 56 | 0 55 W. | 239 | ● | — | — | 99 | W. M. Christy. |
| | Westbourne ... | 50 52 | 0 55 W. | 30 | — | ⊙ | (m.) | 07 | Rev. L. B. Birkett. |
| | M. Worthing ... | 50 49 | 0 22 W. | 36 | III | ⊙ | d.w.m. | 08 | R. H. W. Wilshaw, M.B., D.P.H., for the Corporation. |
| **Wilts :—** | M. Marlborough ... | 51 25 | 1 44 W. | 424 | III | ⊙ | W.m. | 08 | G. G. Becker, M.A., and Meddows Taylor. |
| | Salisbury (Wilton) | 51 4 | 1 51 W. | 180 | II | — | M.R. | 10 | Thos. Challis, for the Earl of Pembroke, G.C.V.O. |
| | Salisbury ... ... | 51 5 | 1 50 W. | 165 | II | — | — | 10 | Capt. H. Tudor Williams. |

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## LIST OF STATIONS ARRANGED ACCORDING TO DISTRICTS AND COUNTIES—*continued.*

| County and Station. | Lat. | Long. | Height in feet above M.S.L. | Order of Station. |  | Publication. | Year of last Inspection. | Observer. |
|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Eye Obs. | Autographic. |  |  |  |
| **LONDON DISTRICT.** |  |  |  |  |  |  |  |  |
| Barnet ... ... ... | 51° 39′ | 0° 10′ W. | 211 | III | — | — | 06 | F. J. Bancroft, B.Sc., M.I.A.C.E., M.I.M.E. |
| Camberwell— |  |  |  |  |  |  |  |  |
| The Green ... ... | 51 28 | 0 5 W. | 17 | — | ● | — | 03 | W. Oxtoby, M.I.C.E., for the Camberwell Borough Council. |
| Forest Hill ... ... | 51 26 | 0 4 W. | 160 | — | ● | — | 03 |  |
| Leyton Square ... | 51 29 | 0 4 W. | 14 | — | ● | — | 03 |  |
| Peckham Rd. ... | 51 28 | 0 5 W. | 21 | — | ● | — | 03 |  |
| Camden Square ... | 51 33 | 0 8 W. | 110 | II | ⊙ (B ●) | M.R.d. | — | H. Robert Mill, D.Sc., LL.D. |
| Chelsea... ... ... | 51 29 | 0 10 W. | 24 | ● | — | — | — | T. W. E. Higgens, C.E., for the Chelsea Borough Council. |
| City (Bunhill Row) ... | 51 31 | 0 5 W. | 80 | — | ⊙ | w.(m.) d. | — | Messrs. De la Rue. |
| East Ham ... ... | 51 32 | 0 3 E. | 12 | III | — | — | — | J. Banks, for the Corporation. |
| Eltham ... ... | 51 28 | 0 4 E. | 209 | III | — | m. | — | Miss A. Bramwell, B.Sc. |
| Greenwich ... ... | 51 28 | 0 0 | 155 | I | (I) | W.M.R.r.d. | — | The Astronomer Royal. |
| Hampstead ... ... | 51 33 | 0 11 W. | 450 | II | ⊙ | M.R.d. | 09 | E. L. Hawke, for the Hampstead Scientific Society. |
| Isleworth ... ... | 51 29 | 0 20 W. | 24 | III | — | — | — | A. Worsley. |
| Kensal Green ... ... | 51 32 | 0 13 W. | 100 | ● | — | — | — | C. W. Heinemann. |
| Kew ... ... ... | 51 28 | 0 19 W. | 18 | I, T | I | W.M.R. | — | C. Chree, Sc.D., F.R.S., Superintendent of the Observatory, for the Meteorological Office. |
| Pall Mall ... ... | 51 30 | 0 7 W. | — | — | B | — | — | Athenæum Club. |
| Norwood ... ... | 51 26 | 0 6 W. | 220 | II | — | M.R. | 09 | W. Marriott. |
| Plumstead ... ... | 51 29 | 0 6 E. | 300 | — | ⊙ | m. | 01 | J. G. Waller. |
| South Kensington | 51 30 | 0 10 W. | 31 | 9, 13, 15, 17, 18h, | ⊙ ✒ B θ ● | M. | — | The Staff of the Meteorological Office. |
| Tottenham ... ... | 51 36 | 0 5 W. | 51 | II | ⊙ | W.M.R. | 10 | J. F. Butler-Hogan, M.D., LL.D., for Urban District Council. |
| *Westminster* ... ... | 51 30 | 0 8 W. | 27 | T | ● B θ | D.W.M.R. | — | The Staff of the Meteorological Office. |
| ,, Training Coll. | 51 30 | 0 8 W. | 107 | — | ⊙ |  |  | J. H. Cowham and Rev. H. B. Workman, D.Lit. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Westminster ... | 51 30 | 0 8 W. | 27 | III | ● | W.M. | | H.M. Office of Works. |
| **6. (*a*) SCOTLAND, WEST.** | | | | | | | | | |
| **Argyleshire :—** | Ardnadam ... | 55 59 | 4 56 W. | 64 | III | (B) | — | — | Rev. J. Cairns Mitchell, B.D. |
| | Gruline, Isle of Mull | 56 30 | 6 0 W. | 100 | ● | — | — | — | J. W. Melles. |
| | Loch Awe :— | | | | | | | | |
| | Cruachan Bothy | 56 14 | 5 28 W. | 283 | ● | — | — | 10 | John Boyd, Crown Forester. |
| | Ford ... ... | 56 10 | 5 26 W. | 148 | ● | — | — | 10 | |
| | Oban ... ... | 56 25 | 5 30 W. | 20 | II | ⊙ | d.m. | 10 | Edwin Baily, M.B., for District Council. |
| | §Poltalloch ... ... | 56 8 | 5 30 W. | 132 | II | — | W.M. | 10 | D. S. Melville, for Col. Malcolm. |
| **Ayr:—** | §Colmonell ... ... | 55 8 | 4 53 W. | 150 | III | (B) | W. | 09 | A. Ogg, for J. W. McConnel. |
| | Kilmarnock ... | 55 37 | 4 36 W. | 90 | III | ⊙ | W.m. | 08 | G. M. Stuart and Thomas Moffat, for the West of Scotland Agric. Coll. |
| **Bute :—** | §Rothesay ... ... | 55 50 | 5 4 W. | 115 | II | — | W.M. | 10 | D. Penney. |
| **Dumbarton :—** | No station. | | | | | | | | |
| **Dumfries :—** | §Dumfries ... ... | 55 4 | 3 36 W. | 160 | II | ⊙ | W.M. | 09 | C. C. Easterbrook, M.D., for the Crichton R. Institution. |
| | Eskdalemuir ... | 55 19 | 3 12 W. | 799 | I | I | M.S. | — | G. W. Walker, M.A., Superintendent of the Observatory. |
| | S. Ruthwell ... ... | 55 0 | 3 26 W. | 67 | II | ⊙ | m. | 10 | W. H. Whellens, for A. Johnstone Douglas. |
| **Kirkcudbright:—** | §Cally (Gatehouse) | 54 52 | 4 12 W. | 120 | II | — | W.M. | 10 | W. Thomson, for Col. F. Murray Baillie. |
| **Lanark :—** | Glasgow ... ... | 55 53 | 4 18 W. | 180 | I | I | W.M.S. | 10 | Prof. L. Becker, Ph.D., for M.O. |
| | Thorntonhall ... | 55 46 | 4 15 W. | 440 | III | ⊙ B | m. | 08<br>11 | John Wilson, for A. Henderson Bishop. |
| **Renfrew :—** | No station. | | | | | | | | |
| **Stirling :—** | No station. | | | | | | | | |
| **Wigton :—** | No station. | | | | | | | | |
| **6. (*b*) ISLE OF MAN.** | | | | | | | | | |
| | Douglas ... ... | 54 10 | 4 28 W. | 277 | II | ⊙ | W.M.S. | 10 | Frank Cottle, for the Corporation. |
| | " ... ... | 54 10 | 4 29 W. | 137 | — | B | — | — | Mrs. A. W. Moore. |

The names of Stations added to the list since April, 1910, are printed in clarendon type. The positions of the Stations can be identified on the map, Fig. 11, p. 80, from the figures which give their heights above Mean Sea Level.

## List of Stations arranged according to Districts and Counties—*continued.*

| County and Station. | | Lat. | Long. | Height in feet above M.S.L. | Order of Station. | | Publication. | Year of last Inspection. | Observer. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Eye Obs. | Autographic. | | | |
| **7. (*a*) ENGLAND, NORTH WEST.** | | | | | | | | | |
| **Cheshire:—** | Bidston ... ... | 53° 24′ | 3° 4′ W. | 188 | (I) T | (I) ⊙ | D.W.M.R.r. | 10 | W. E. Plummer, M.A., F.R.A.S., for the Mersey Docks and Harbour Board. |
| | Hawarden Bridge ... | 53 12 | 3 1 W. | 22 | III | — | W.m. | 08 | F. B. Summers. |
| | M. Hoylake ... ... | 53 23 | 3 12 W. | 30? | III | ⊙ | w.m. | 02 | Tom Robinson, for Urban District Council. |
| | *Liscard* ... ... | 53 25 | 3 5 W. | 67 | ● | B | — | — | H. Norman Edge. |
| **Cumberland:—** | Aspatria ... ... | 54 46 | 3 21 W. | 250 | II | ⊙ (⟋) | W.M.R. | 09 | J. Smith Hill, B.A., B.Sc., Agricultural College. |
| | Newton Rigg... ... | 54 40 | 2 49 W. | 559 | II | ⊙ | W.M. | 08 | W. T. Lawrence, for the Cumberland County Council. |
| | Uldale (Chapel House Reservoir). | 54 43 | 3 9 W. | 599 | ● | — | — | — | T. Strong, for Aspatria and Silloth Water Board. |
| **Lancashire:—** | M. Blackpool ... ... | 53 49 | 3 3 W. | 66 | II | ⊙ (B ⟋ ●) | d.W.M. | 08 | E. W. Rees Jones, M.D., D.P.H., for the Corporation. |
| | Burnley ... ... | 53 48 | 2 15 W. | 459 | III | ⊙ (B) | m.r. | 08 | Thos. Holt, M.D., for the Corporation. |
| | Carnforth (Over Kellet). | 54 8 | 2 44 W. | 174 | III | ⊙ | m. | 08 | W. Farrer. |
| | Darwen ... ... | 53 41 | 2 28 W. | 722 | II | ⊙ | d.M. | 08 | F. G. Haworth, M.B., for the Corporation. |
| | Fleetwood ... ... | 53 56 | 3 1 W. | — | — | ⟋ | — | 10 | The Urban District Council, for the Meteorological Office. |
| | Graythwaite ... ... | 54 19 | 3 0 W. | 180 | ● | — | — | — | H. T. Gnosspelius. |
| | Lancaster ... ... | 54 3 | 2 47 W. | 311 | III | ⊙ (⟋) ● | m. | 09 | Neville Holden, F.R.A.S., for the Storey Institute. |
| | Rossall Beach ... | 53 55 | 3 2 W. | 0 | III | B | d. | — | T. G. Benn. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Manchester (Oldham Road). | 53 29 | 2 13 W | 190 | II | ⊙ | M.R.w. | 08 | J. Niven, M.A., M.B., for the Corporation. |
| | „ (Whitworth Park). | 53 28 | 2 14 W. | 125 | II | K ⊙ (B ⫽) | d.M. | 08 | The University of Manchester. |
| | „ (Prestwich) | 53 32 | 2 17 W. | 320 | II | ⊙ | W.M.r. | 08 | F. Gore, for Medical Superintendent of the Asylum. |
| | M. Southport ... ... | 53 39 | 2 59 W. | 37 | II$_2$ | (I) ⊙ ⫽ | d.w.M.R. ⫽ | 07 | J. Baxendell, for the Corporation. |
| | Stonyhurst ... ... | 53 51 | 2 28 W. | 375 | I | I | W.M.S.R. ⫽ | 10 | Rev. W. Sidgreaves, S.J., for M.O. |
| **Westmorland :—** | Kirkby Lonsdale ... | 54 12 | 2 36 W. | 304 | ● | — | — | — | R. A. Clarke. |
| **7. (*b*) NORTH WALES.** | | | | | | | | | |
| **Anglesey :—** | Holyhead (Salt Island) | 53 18 | 4 39 W. | 57 | — | ⫽ | ⫽ | 10 | F. M. Cotton, C.E., for M.O. |
| | „ (town) ... | 53 18 | 4 39 W. | 48 | T, II$_2$ | B | D.W.M. | 10 | T. Chope, for M.O. |
| | Llaneugrad ... ... | 53 20 | 4 16 W. | 414 | II | ⊙ ⫽ (B) | M. | 10 | W. E. Sotheby. |
| **Carnarvon :—** | Colwyn Bay ... ... | 53 16 | 3 44 W. | 82 | III | ⊙ | d.m. | 10 | Wm. Jones, A.M.I.C.E., for Urban District Council. |
| | M. Llandudno ... ... | 53 20 | 3 50 W. | 71 | II | ⊙ | d.W.M.R. | 10 | William Little, for the Town Council. |
| | Penrhyn Quarry ... | 53 10 | 4 6 W. | 527 | ● | — | — | 01 | W. J. Griffith, for Lord Penrhyn. |
| **Denbigh :—** | Bettws-y-Coed ... | 53 7 | 3 53 W. | 101 | II | ⊙ | d.W.M.R. | 08 | Dr. H. W. Fox, for District Council. |
| | Llanbedr Hall (Ruthin) | 53 8 | 3 17 W. | 450 | ● | — | — | — | George A. Crace-Calvert, M.B. |
| **Flint:—** | Penbedw ... ... | 53 12 | 3 11 W. | 650 | — | B | — | — | H. W. Buddicom. |
| | Rhyl ... ... ... | 53 19 | 3 29 W. | 30 | III | ⊙ | d.w.m. | 08 | A. A. Goodall, for District Council. |
| | St. Asaph (St. Beuno's College). | 53 15 | 3 23 W. | 479 | III | (B) | m. | 10 | Rev. J. Rowland, S.J. and Rev. C. Baillon, S.J., B.Sc. |
| **Merioneth :—** | Aberdovey ... ... | 52 33 | 4 4 W. | 22 | III | ⊙ | w.m. | 10 | W. J. Eves. |
| | M. Towyn ... ... | 52 35 | 4 5 W. | 10 | III | ⊙ | d. | 10 | E. Lewys Lloyd, M.D., for Urban District Council. |
| **Montgomery:—** | No station. | | | | | | | | |
| **8. (*a*) SOUTH WALES.** | | | | | | | | | |
| **Brecknock :—** | Llangammarch Wells | 52 7 | 3 32 W. | 550 | III | ⊙ | W.m.R. | 09 | W. Black Jones, M.D., B.Sc., D.P.H. |
| **Cardigan :—** | M. Aberystwyth... ... | 52 25 | 4 4 W. | 59 | III | ⊙ | d.w.m. | 10 | A. Thomas, M.D., for the Urban Council. |
| | Lampeter ... ... | 52 7 | 4 5 W. | 498 | ● | — | — | — | John C. Harford. |
| **Carmarthen :—** | Llandovery ... ... | 51 59 | 3 48 W. | 248 | ● | — | — | — | Douglas T. M. Jones. |

The names of Stations added to the list since April, 1910, are printed in clarendon type. The positions of the Stations can be identified on the map, Fig. 11, p. 80, from the figures which give their heights above Mean Sea Level.

## LIST OF STATIONS ARRANGED ACCORDING TO DISTRICTS AND COUNTIES—*continued.*

| County and Station. | | Lat. | Long. | Height in feet above M.S.L. | Order of Station. | | Publication. | Year of last Inspection. | Observer. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Eye Obs. | Autographic. | | | |
| **8. (*a*) SOUTH WALES**—*cont.* | | | | | | | | | |
| **Glamorgan :—** | Cardiff ... ... | 51 28 | 3 10 W. | 203 | III | ⊙ | W.m.r. | 10 | E. Walford, M.D., for the Corporation. |
| | Port Talbot ... ... | 51 34 | 3 45 W. | 179 | ● | ⊙ | (m.) | 03 | Miss Talbot; G. Lipscomb. |
| | Swansea ... ... | 51 37 | 3 55 W. | 24 | III | — | m. | 10 | D. Bliss, for the Corporation. |
| **Pembroke :—** | Haverfordwest ... | 51 48 | 4 58 W. | 93 | (II) | ⊙ (B) | (m.) | 10 | J. W. Phillips. |
| | Pembroke (St. Ann's Head). | 51 41 | 5 11 W. | 149 | T, II$_3$ | ⊙ | D.W.M.R. | 10 | Lightkeepers, for M.O. |
| | Tenby ... ... ... | 51 41 | 4 42 W. | 79 | — | ⊙ | w.(m.) | 03 | Miss M. B. Truscott, for the Corporation. |
| **Radnor :—** | Llandrindod Wells ... | 52 14 | 3 23 W. | 699 | ● | — | — | — | W. B. de Winton. |
| | Rhayader Watershed | 52 18 | 3 29 W. | * | (15) ● | — | — | — | Corporation of Birmingham, Water Department. |
| **8. (*b*) ENGLAND, SOUTH WEST.** | | | | | | | | | |
| **Cornwall :—** | Falmouth ... ... | 50 9 | 5 4 W. | 167 | I | I | W.M.R.S. | 10 | Royal Cornwall Polytechnic Society, for M.O. |
| | " Pendennis Castle. | 50 8 | 5 3 W. | — | — | ⫽ | — | 10 | Coastguard, for M.O. |
| | Fowey ... ... | 50 21 | 4 38 W. | 51 | III | ⊙ | m. | 10 | Dr. W. H. Boger. |
| | M. Newquay ... ... | 50 25 | 5 4 W. | 190 | T | ⊙ | w.(m.) | 10 | C. C. Vigurs, B.A., M.D., for Urban District Council. |
| | M. Penzance ... ... | 50 7 | 5 32 W. | 54 | III | ⊙ (B) | m. | 10 | Chas. H. Benn, for District Council. |
| **Devonshire:—** | Arlington Court ... | 51 8 | 3 58 W. | 613 | III | — | W.m. | 10 | Miss Chichester. |
| | Barnstaple ... ... | 51 5 | 4 3 W. | 24 | III | — | — | 06 | Thos. Wainwright, for the North Devon Athenæum. |
| | 𝔐Cullompton ... ... | 50 51 | 3 23 W. | 202 | III | ⊙ | W.m. | 10 | M. T. Foster. |
| | Paignton ... ... | 50 26 | 3 34 W. | 11 | II | ⊙ (B) | m.d. | 10 | F. J. Rodgers, for Town Council. |
| | Plymouth ... ... | 50 22 | 4 8 W. | 116 | II$_3$ | ⊙ ⫽ (B) | d.W.M.R.r.⫽ | 10 | H. Victor Prigg, A.M.I.C.E., for the Corporation. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | M. Salcombe ... ... | 50 14 | 3 46 W. | 300 | — | ⊙ | (m.)w. | 04 | V. W. Twining, M.D., and W. Coleridge Roberts. |
| | M. Sheepstor ... ... | 50 29 | 4 1 W. | 749 | II | — | m. | 10 | Rev. H. H. Breton, M.A. |
| | M. Teignmouth ... ... | 50 33 | 3 29 W. | 20 | III | ⊙ | d.m. | 10 | G. Rossiter for M.O.H. |
| | M. Torquay ... ... | 50 28 | 3 31 W. | 12 | III | ⊙ | d.w.(m.) | 00 | F. March, for the Corporation. |
| | 𝔐Whitchurch ... ... | 50 32 | 4 6 W. | 593 | II | — | M. | 10 | E. E. Glyde. |
| | 𝔐Woolacombe ... ... | 51 10 | 4 12 W. | 59 | II | ⊙ | M.R. | 10 | R. N. Kivell, for Miss Chichester. |
| **Dorset :—** | Parkstone ... ... | 50 43 | 1 56 W. | 197 | ● | — | — | 00 | C. Mabey. |
| | Portland Bill... ... | 50 32 | 2 27 W. | 19 | T, $\mathrm{II}_3$ | B | D.W.M.R. | 10 | G. Carpenter, Lightkeeper, for M.O. |
| | 𝔐Shaftesbury ... ... | 51 1 | 2 12 W. | 722 | III | — | W.m. | 10 | Rev. F. Ehlvers. |
| | M. Weymouth ... ... | 50 36 | 2 27 W. | 21 | III | ⊙ | d.m. | 08 | I. J. Brown. |
| **Gloucester :—** | Bristol, Over Court Park. | 51 32 | 2 35 W. | 147 | III | — | r. | 07 | R. C. Cann Lippincott. |
| | Clifton, Bristol ... | 51 27 | 2 37 W. | 229 | III | ⊙ | W.R.m. | 09 | D. Rintoul, M.A. |
| **Monmouth :—** | Abergavenny ... | 51 49 | 3 2 W. | 178 | ● | — | — | — | A. V. Whitehead. |
| | Abersychan ... ... | 51 44 | 3 5 W. | 698 | ● | — | — | — | W. P. James. |
| | Newchurch ... ... | 51 41 | 2 48 W. | 525 | ● | — | — | — | |
| | Newport ... ... | 51 35 | 3 0 W. | 32 | III | — | — | 04 | C. Cullum, for the Corporation of Newport. |
| | Pant-yr-eos ... ... | 51 38 | 3 4 W. | 449 | ● | — | — | 00 | |
| | Ynis-y-fro ... ... | 51 38 | 3 3 W. | 151 | ● | — | — | 00 | |
| 9. IRELAND, NORTH. | | | | | | | | | |
| (a) *Western Part.* | | | | | | | | | |
| **Galway :—** | Ardfry ... ... | 53 19 | 9 0 W. | — | — | B | — | — | W. M. Tattersall, for the Department of Agriculture for Ireland. |
| | Recess ... ... | 53 28 | 9 44 W. | 90 | ● | — | — | — | M. Macarthy, for the M. G.W. Railway. |
| **Leitrim :—** | Carrigallen ... ... | 53 58 | 7 38 W. | 350? | ● | — | — | — | Miss Morrow. |
| **Mayo :—** | Blacksod Point ... | 54 6 | 10 4 W. | 37 | T, $\mathrm{II}_3$ | B | D.W.M.R.r. | 10 | The Chief Officer, Coastguard, for M.O. |
| | Mallaranny ... ... | 53 55 | 9 40 W. | 119 | ● | — | — | 10 | The Manageress of the Hotel for the M. G.W. Railway. |
| **Roscommon :—** | No station. | | | | | | | | |
| **Sligo :—** | Markree Castle ... | 54 11 | 8 27 W. | 122 | II | ⊙ | W.M.S.R. | 09 | J. R. Armstrong, for Captain Cooper. |

The names of Stations added to the list since April, 1910, are printed in clarendon type. The positions of the Stations can be identified on the map, Fig. 11, p. 80, from the figures which give their heights above Mean Sea Level.

* 15 Rainfall Stations.

## LIST OF STATIONS ARRANGED ACCORDING TO DISTRICTS AND COUNTIES—*continued.*

| County and Station. | | Lat. | Long. | Height in feet above M.S.L. | Order of Station. | | Publication. | Year of last Inspection. | Observer. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Eye Obs. | Autographic. | | | |
| **9. IRELAND, NORTH**—*cont.* | | | | | | | | | |
| (b) *Eastern Part.* | | | | | | | | | |
| Antrim :— | Belfast ... ... | 54° 35′ | 5° 56′ W. | 61 | III | — | M. R. | 09 | John Wylie, B.A., and G. Robinson, for Prof. Morton. |
| | Glenarm ... ... | 54 58 | 5 56 W. | 41 | ● | — | — | — | The Earl of Antrim. |
| Armagh :— | Armagh ... ... | 54 21 | 6 39 W. | 196 | II | ↗ ⊙ ● | W.M.S.R. | 10 | J. L. E. Dreyer, Ph.D., for M.O. |
| Cavan :— | No station. | | | | | | | | |
| Donegal :— | Dunfanaghy ... ... | 55 11 | 7 58 W. | 54 | II | — | m. | — | J. J. MacGrath, L.R.C.P. |
| | Killybegs ... ... | 54 40 | 8 27 W. | 221 | ● | — | — | — | John C. Ward. |
| | Malin Head ... ... | 55 23 | 7 24 W. | 230 | T | B | D.W.M.R.r. | 10 | Chief Officer, Coastguard, for M.O. |
| | Rosbeg (Narin) ... | 54 50 | 8 30 W. | — | — | B | — | 05 | J. McLoone, Postmaster. |
| Down :— | Donaghadee ... ... | 54 38 | 5 32 W. | 40 | T, $II_3$ | B | D.W.M.R.r. | 10 | T. Arnell, Coastguard, for M.O. |
| Fermanagh :— | No station. | | | | | | | | |
| Londonderry :— | No station. | | | | | | | | |
| Longford :— | No station. | | | | | | | | |
| Louth :— | No station. | | | | | | | | |
| Meath :— | No station. | | | | | | | | |
| Monaghan :— | No station. | | | | | | | | |
| Tyrone :— | No station. | | | | | | | | |
| Westmeath :— | No station. | | | | | | | | |
| **10. IRELAND, SOUTH.** | | | | | | | | | |
| (a) *Eastern Part.* | | | | | | | | | |
| Carlow :— | No station. | | | | | | | | |
| Dublin :— | M. Dublin City ... ... | 53 20 | 6 15 W. | 47 | II | B | d.W.M.R. | 07 | Sir John W. Moore, M.D., D.Sc. |
| | „ Phœnix Park | 53 22 | 6 21 W. | 155 | II | ⊙ ↗ | w.M.S. | 09 | Lt.-Col. C. C. J. Pery, R.E., Ordnance Survey Office. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | ,, Botanic Gardens. | 53 23 | 6 16 W. | 67 | II | — | m. | 07 | F. W. Moore, M.R.I.A. |
| | ,, Trinity College | 53 21 | 6 16 W. | 12 | II | ⊙ | M.(R.)w. | 07 | W. J. Good and W. H. Clark, for Prof. Thrift. |
| | Killiney ... ... | 53 16 | 6 7 W. | 249 | ● | — | — | — | Mrs. G. B. Symes. |
| | M. Kingstown ... ... | 53 17 | 6 8 W. | 42 | III | ⊙ | m. | 09 | The late R. A. O'Donovan, M.D., J. S. Vaughan, LL.D., Town Clerk, for the Corporation. |
| | ,, Harbour ... | 53 17 | 6 8 W. | — | — | 🪶 | 🪶 | 10 | Captain A. F. Holmes, R.N., for H.M. Office of Works. |
| Kildare :— | Clongowes Wood College. | 53 19 | 6 41 W. | 245 | II | (B θ) ⊙ | m. | 09 | Rev. J. J. Nerney, S.J. |
| Kilkenny :— | Kilkenny ... ... | 52 39 | 7 14 W. | 212 | III | B | W.m. | 09 | E. Sutton, for the Marquis of Ormonde, K.P. |
| King's Co. :— | Birr Castle ... ... | 53 6 | 7 55 W. | 175 | II, T | ⊙ | D.W.M.S.R.r. | 09 | Dr. Boeddicker, for the Earl of Rosse. |
| Queen's Co. :— | Mountmellick ... | 53 7 | 7 20 W. | 253 | III | — | m. | 09 | W. A. Robinson. |
| Waterford :— | Waterford ... ... | 52 16 | 7 7 W. | — | — | B | — | 02 | Harbour Authorities. |
| | ,, ... ... | 52 16 | 7 7 W. | 20 ? | III | — | W.m.R. | 07 | J. N. White. |
| Wexford :— | No station. | | | | | | | | |
| Wicklow :— | *Bray* ... ... | 53 12 | 6 6 W. | 153 | ● | — | — | — | Miss A. L. Scott. |
| | M. Newcastle ... ... | 53 5 | 6 6 W. | 256 | II | — | m. | 02 | L. T. Burra, M.D., and J. T. Crowe, M.D. |
| (b) *Western Part.* | | | | | | | | | |
| Clare :— | Ennistymon ... ... | 52 57 | 9 17 W. | 130 | ● | — | — | — | Rev. C. W. McDowell, M.A. |
| | Hurdlestown ... | 52 48 | 8 38 W. | 157 | ● | — | — | — | Lt.-Col. W. O. Bentley, R.A. |
| | Mount Callan ... | 52 53 | 9 16 W. | 479 | ● | — | — | 98 | Lt.-Col. Tottenham. |
| | Newmarket-on-Fergus. | 52 46 | 8 53 W. | 85 | ● | — | — | 98 | Alfred Barker, for W. W. A. Fitzgerald. |
| Cork :— | Ballinacurra ... ... | 51 52 | 8 10 W. | 24 | III | ⊙ | w.m. | 10 | John H. Bennett. |
| | Roche's Point ... | 51 47 | 8 15 W. | 32 | T | — | D.W.M.R.r. | 10 | M. FitzMahony, Post Office, for M.O. |
| | ,, ,, ... | 51 47 | 8 15 W. | — | — | 🪶 | 🪶 | 10 | Captain G. Usborne, for Cork Harbour Commissioners. |

The names of Stations added to the list since April, 1910, are printed in clarendon type. The positions of the Stations can be identified on the map, Fig. 11, p. 80, by the figures which give their heights above Mean Sea Level.

## LIST OF STATIONS ARRANGED ACCORDING TO DISTRICTS AND COUNTIES—*continued.*

| County and Station. | | Lat. | Long. | Height in feet above M.S.L. | Order of Station. | | Publication | Year of last Inspection. | Observer. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Eye Obs. | Autographic. | | | |
| **10. IRELAND, SOUTH**—*cont.* | | | | | | | | | |
| (b) *Western Part*—cont. | | | | | | | | | |
| **Kerry** :— | Caragh Lake ... ... | 52° 3′ | 9° 53′ W. | 59 | ● | — | — | — | Admiral E. F. Jeffreys, C.V.O. |
| | Killarney ... ... | 52 4 | 9 30 W. | 174 | III | — | W.m.R. | 09 | E. W. Griffin, M.D. |
| | Valencia ... ... | 51 56 | 10 15 W. | 30 | I, T | I, B | D.W.M.R.r. | 10 | J. E. Cullum, for M.O. |
| | " Glanleam ... | 51 56 | 10 20 W. | — | ● | — | — | 01 | A. O'Donoghue. |
| **Limerick** :— | Foynes ... ... | 52 37 | 9 7 W. | 108 | III | — | W.m. | 09 | J. J. Alcorn, for Lord Monteagle, K.P. |
| | Limerick (Derravoher) | 52 38 | 8 40 W. | 40 | ● | — | — | 09 | Sir A. W. Shaw. |
| | " (Mungret Coll.). | 52 38 | 8 41 W. | 47 | II | (B) | M. | 10 | Rev. W. O'Leary, S.J. |
| **Tipperary** :— | 𝔐Cahir (Bengurragh) | 52 22 | 7 56 W. | 199 | III | — | W.m. | 10 | R. W. Smith, Jun. |
| **11. ENGLISH CHANNEL (WESTERN SECTION).** | | | | | | | | | |
| **Guernsey** :— | M. St. Peter Port, Villa Carey. | 49 27 | 2 32 W. | 180 | III | ⊙ | W.m. | 08 | F. E. Carey, M.D. |
| | St. Peter Port, Brooklyn. | 49 27 | 2 31 W. | 297 | II | ⊙ (B θ) | w.M.R. | 08 | Adolphus Collenette. |
| **Jersey** :— | St. Aubin's ... ... | 49 12 | 2 11 W. | 25 | T, $II_3$ | — | D.W.M.R. | 10 | J. Fisher, for M.O. |
| | St. Helier's ... ... | 49 11 | 2 6 W. | — | — | ⊙ | d.w.(m.)R. | 10 | Signal Officer, Fort Regent, for M.O. |
| **Scilly** :— | St. Mary's ... ... | 49 56 | 6 18 W. | 131 | T, $II_3$ | B ↗ ⊙ | D.W.M.R. ↗ | 10 | The Coastguard, for M.O. |

The names of Stations added to the list since April, 1910, are printed in clarendon type. The positions of the Stations can be identified on the map, Fig. 11, p. 80, by the figures which give their heights above Mean Sea Level.

## LIST OF FOREIGN STATIONS FROM WHICH REPORTS ARE RECEIVED DAILY BY TELEGRAPH. (*See* PAGE 61.)

| Name of Station. | Authority. |
|---|---|
| [2]Reykjavik (Iceland) | Meteorological Institute, Copenhagen.<br>Captain Ryder, *Director.* |
| [2]*Blonduös (Iceland) | |
| [2]*Akureyri (Iceland) | |
| [2]Isafjord (Iceland) | |
| [2]Seydisfjord (Iceland) | |
| [2]Thorshavn, Faeröe Islands | |
| Haparanda | Meteorological Office, Stockholm.<br>Dr. Hamberg, *Director.* |
| Hernösand | |
| [2]Stockholm | |
| Wisby | |
| Karlstad | |
| Bodö | Meteorological Institute, Christiania.<br>Professor Mohn, *Director.* |
| [2]Christiansund | |
| [2]Skudesnaes | |
| Færder | |
| [2]The Skaw | Meteorological Institute, Copenhagen.<br>Captain Ryder, *Director.* |
| Blaavands Huk | |
| Cuxhaven | Deutsche Seewarte, Hamburg.<br>Admiral Herz, *Director.* |
| Berlin | |
| Frankfurt | |
| Munich | |
| [2]The Helder | Meteorological Institute, Utrecht.<br>Dr. van Everdingen, *Director.* |
| Brussels | Meteorological Service, Brussels.<br>M. J. Vincent, *Director.* |
| Cape Gris Nez | Bureau Central Météorologique, Paris.<br>M. Alfred Angot, *Director.* |
| La Hève | |
| *Ushant | |
| [2]Brest (St. Mathieu) | |
| Lorient (Ile de Groix) | |
| *Er-Hastellic | |
| [1][2]Rochefort (Ile d'Aix) | |
| *Chassiron | |
| *La Coubre | |
| [2]Biarritz | |
| [2]Paris | |
| Belfort | |
| Lyons | |
| Nice | |
| Perpignan | |
| *Cape Béarn | |
| Sanguinaire (Corsica) | |
| Corunna | Central Meteorological Institute, Madrid.<br>M. J. Galbis, *Director.* |
| Lisbon | Observatory, Lisbon.<br>M. Pina Vidal, *Director.* |
| Madeira (Funchal) | |
| [2]Azores (Ponta Delgada) | Meteorological Service of the Azores.<br>Major Chaves, *Director.* |
| ,, (Horta) | |

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*Note.*—The stations marked (¹) report also at 1h. p.m., and those marked (²) at 6h. p.m. Lisbon reports at 4h. p.m. instead of 6h. p.m., and Ponta Delgada at 3h. p.m.

* The reports from these stations are not published in the Daily Weather Report.

## LIST OF ADDITIONAL STATIONS FROM WHICH REPORTS ARE RECEIVED FOR THE DAILY WEATHER REPORT. (*See* PAGE 61.)

| Station. | Hour of Observation. | Station. | Hour of Observation. |
|---|---|---|---|
| Oban | 6 p.m. By wire | Worthing | 6 p.m. By wire and post. |
| Stonehaven | 6 p.m. By wire. | Brighton | 6 p.m. By wire and post. |
| Dublin | 4 p.m. By post. | Seaford | 6 p.m. By wire and post. |
| Douglas | 6 p.m. By wire. | Eastbourne | 6 p.m. By wire and post. |
| Blackpool | 6 p.m. By wire; and 9 p.m. by post. | Bexhill-on-Sea | 9 p.m. By post. |
| Southport | 6 p.m. By wire; and 9 p.m. by post | Hastings | 6 p.m. By wire and post. |
| Rhyl | 6 p.m. By wire and post. | Folkestone | 6 p m. By wire and post. |
| Colwyn Bay | 6 p.m. By wire and post. | Deal | 6 p.m. By wire and post. |
| Llandudno | 6 p.m By wire; and 9 p.m. by post. | Ramsgate | 6 p.m. By wire and post. |
| Bettws-y-Coed | 6 p.m. By wire. | Margate | 6 p.m. By wire and post. |
| Aberystwyth | 6 p.m. By wire. | Felixstowe | 6 p.m. By wire and post. |
| Plymouth | 9 p.m. By post. | Lowestoft | 6 p.m. By wire and post. |
| Paignton | 6 p.m. By wire and post. | Skegness | 6 p.m. By wire and post. |
| Torquay | 6 p.m. By wire and post. | Scarborough | 6 p.m. By wire; and 9 p.m. by post. |
| Teignmouth | 9 p.m. By post. | Harrogate | 6 p.m. By wire and post. |
| Weymouth | 6 p.m. By wire and post. | Buxton | 6 p.m. By wire and post. |
| Bournemouth | 6 p.m. By wire and post. | Darwen | 9 p.m. By post. |
| Southsea | 6 p.m. By wire. | Manchester | 9 p.m. Bv post. |
|  |  | Birmingham | 9 p.m. By post. |

## LIST OF SEA TEMPERATURE STATIONS.

§*Aberdeen, Cove Bay.
*Arran, North, Galway.
†Bahama Bank Lightship.
§*Ballantrae, Ayrshire.
*Ballydonegan, Co. Cork.
†Barrels Rock Lightship.
*Blacksod Point, Co. Mayo.
†Blackwater Bank Lightship.
§*Burnmouth, Ayton, Berwick.
*Burntisland.
†Carnarvon Bay Lightship.
§†Cleggan, Co. Galway.
†Coningbeg Lightship.
§*Cromarty.
†Daunts Rock Lightship.
§[1] Eastbourne.
†East Goodwin Lightship.
†English and Welsh Grounds Lightship.
†Fastnet Rock Lighthouse.
[2] Holyhead Harbour Office.
§*Kirkwall.
†Kish Bank Lightship.
§*Lamlash, Isle of Arran.
†Leman and Ower Lightship.
§*Lerwick.
*Liscannor, Co. Clare.
§[3] Margate.
†Morecambe Bay Lightship.
†Newarp Lightship.
§*Newquay, Cornwall.
†North Arklow Lightship.
*North Arran (*see* Arran).
†North-West Lightship.
†Outer Dowsing Lightship.
†Owers Lightship.
§*Pennan Bay (Aberdour).
§[4] Plymouth.
§[5] Port Erin.
*Portrush.
†Royal Sovereign Lightship.
*St. Ann's Head, Pembroke.
§*Salcombe, Devon.
§*Scarborough.
* Scilly Islands (St. Mary's).
§*Seafield, Co. Clare.
†Seven Stones Lightship.
†Shambles Lightship.
§ Sheephaven (Dunfanaghy).
§†Shipwash Lightship.
†Skulmartin Lightship.
†Smith's Knoll Lightship.
†Solway Lightship.
†South Arklow Lightship.
†South Rock Lightship.
†Spurn Lightship.
*Stornoway.
*Sunderland.
§*Teelin, Co. Donegal.
*Usan (Montrose).
†Varne Lightship.
§*Wick.

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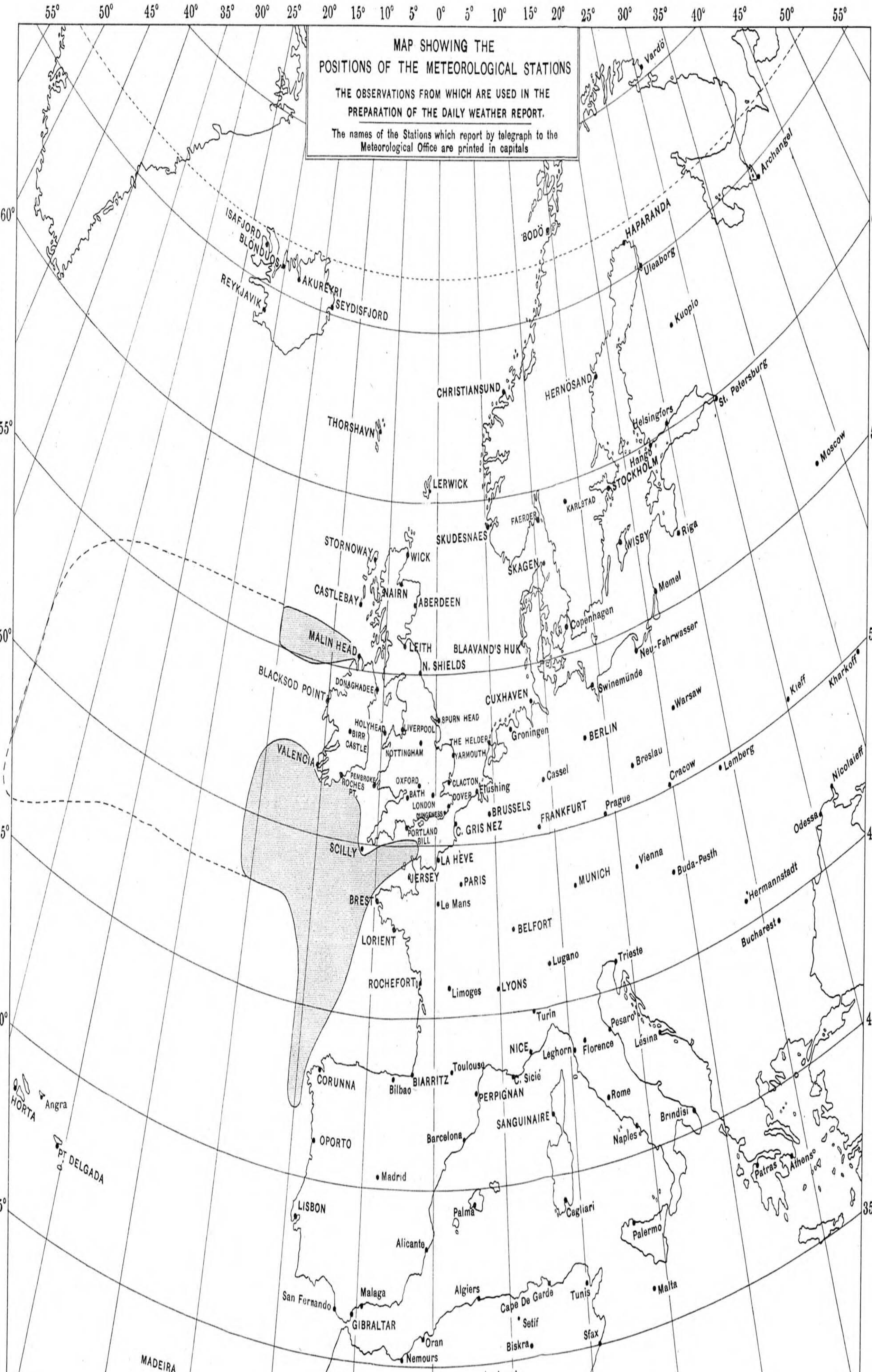
The observers are indicated thus :—* Coastguard, † Lightkeepers, [1] S. R. Henderson, [2] F. M. Cotton, C.E., [3] W. J. Woodruff, [4] H. Victor Prigg, [5] Biological Station.

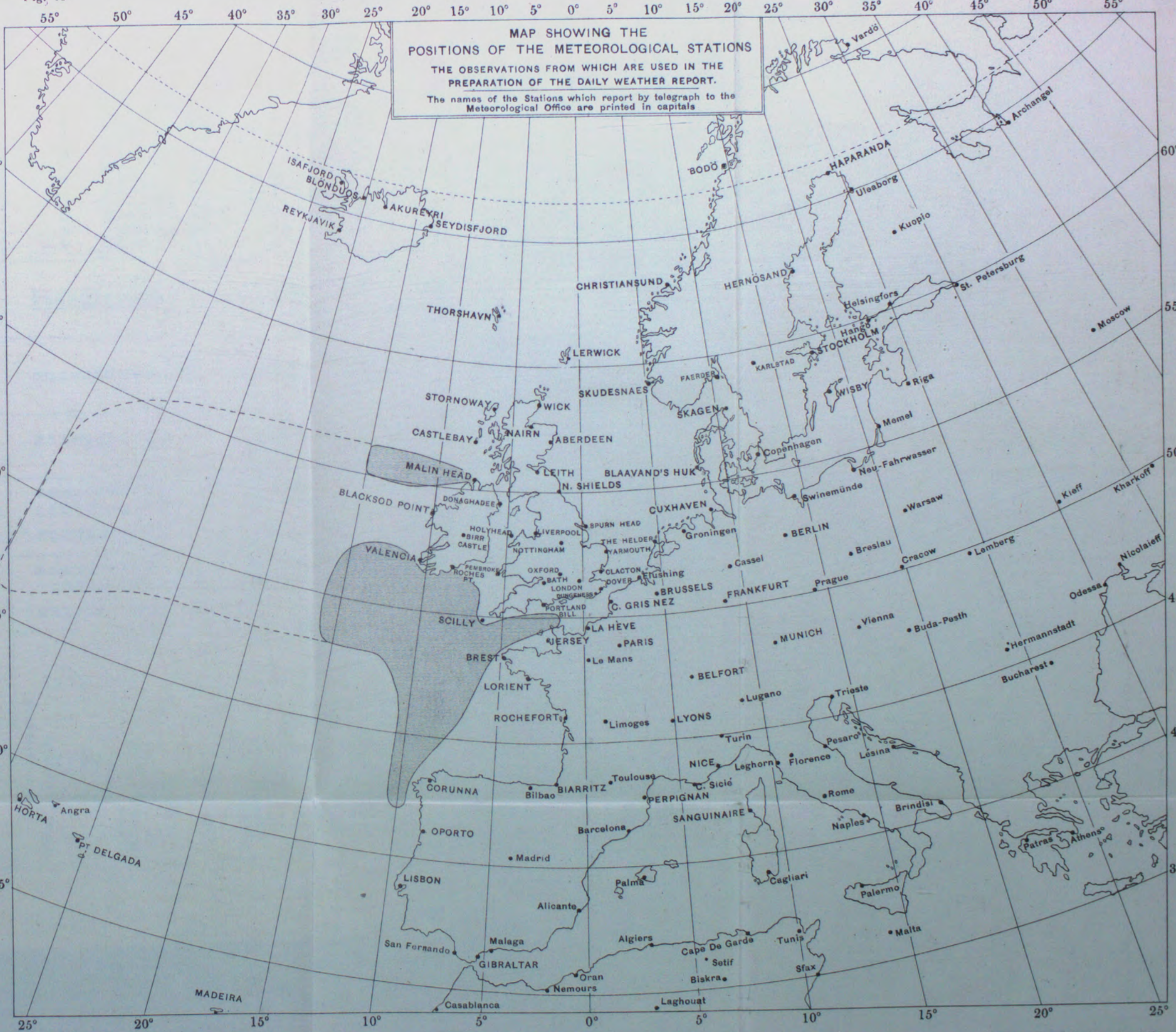
§ Stations marked thus send weekly returns for publication in the Weekly Weather Report.


MAP SHOWING THE
POSITIONS OF THE METEOROLOGICAL STATIONS
THE OBSERVATIONS FROM WHICH ARE USED IN THE
PREPARATION OF THE DAILY WEATHER REPORT.
The names of the Stations which report by telegraph to the Meteorological Office are printed in capitals
55° 50° 45° 40° 35° 30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30° 35° 40° 45° 50° 55°
60° 55° 50° 45° 40° 35°
25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25°
Vardö
Archangel
BODÖ
HAPARANDA
Uleaborg
ISAFJORD
BLÖNDUOS
AKUREYRI
SEYDISFJORD
REYKJAVIK
Kuopio
HERNÖSAND
CHRISTIANSUND
St. Petersburg
THORSHAVN
Helsingfors
Hangö
STOCKHOLM
Moscow
LERWICK
KARLSTAD
FAERDER
SKUDESNAES
WISBY
Riga
STORNOWAY
WICK
SKAGEN
CASTLEBAY
NAIRN
ABERDEEN
Memel
Copenhagen
MALIN HEAD
LEITH
BLAAVAND'S HUK
N. SHIELDS
Neu-Fahrwasser
BLACKSOD POINT
DONAGHADEE
Swinemünde
CUXHAVEN
Kharkoff
Kieff
Warsaw
HOLYHEAD
BIRR CASTLE
LIVERPOOL
SPURN HEAD
THE HELDER
Groningen
BERLIN
VALENCIA
NOTTINGHAM
YARMOUTH
PEMBROKE
ROCHES PT.
OXFORD
BATH
LONDON
CLACTON
DOVER
Flushing
Cassel
Breslau
Lemberg
Nicolaieff
DUNGENESS
PORTLAND BILL
C. GRIS NEZ
BRUSSELS
FRANKFURT
Prague
Cracow
Odessa
SCILLY
LA HEVE
JERSEY
PARIS
MUNICH
Vienna
Buda-Pesth
Hermannstadt
BREST
Le Mans
BELFORT
Bucharest
LORIENT
Lugano
Trieste
ROCHEFORT
Limoges
LYONS
Turin
Pesaro
Lesina
NICE
Leghorn
Florence
CORUNNA
Bilbao
BIARRITZ
Toulouse
C. Sicié
PERPIGNAN
Rome
HORTA
Angra
SANGUINAIRE
Brindisi
Naples
OPORTO
Barcelona
PT. DELGADA
Madrid
Patras
Athens
LISBON
Palma
Cagliari
Palermo
Alicante
Malta
Algiers
Tunis
San Fernando
Malaga
Cape De Garde
Setif
GIBRALTAR
Oran
Biskra
Sfax
MADEIRA
Nemours
Casablanca
Laghouat

Note:— *The shaded portions of the Atlantic and Bay of Biscay indicate the areas from which wireless reports were received within 2 hours of the time at which the observations were made. The pecked lines indicate the limits of the areas from which they were received within 24 hours*

*Ordnance Survey, Southampton, 1911.*

Fig. 13



MAP SHOWING THE
POSITIONS OF THE METEOROLOGICAL STATIONS
THE OBSERVATIONS FROM WHICH ARE USED IN THE
PREPARATION OF THE DAILY WEATHER REPORT.
The names of the Stations which report by telegraph to the
Meteorological Office are printed in capitals

55°
50°
45°
40°
35°
30°
25°
20°
15°
10°
5°
0°
5°
10°
15°
20°
25°
30°
35°
40°
45°
50°
55°
60°
55°
50°
45°
40°
35°
Vardö
Archangel
BODÖ
HAPARANDA
Uleaborg
Kuopio
ISAFJORD
BLÖNDUÓS
AKUREYRI
REYKJAVIK
SEYDISFJORD
HERNÖSAND
CHRISTIANSUND
St. Petersburg
Helsingfors
Hangö
STOCKHOLM
Moscow
THORSHAVN
LERWICK
KARLSTAD
FAERDER
SKUDESNAES
WISBY
Riga
STORNOWAY
WICK
SKAGEN
Memel
CASTLEBAY
NAIRN
ABERDEEN
Copenhagen
Neu-Fahrwasser
MALIN HEAD
LEITH
BLAAVAND'S HUK
N. SHIELDS
Swinemünde
Kieff
Kharkoff
BLACKSOD POINT
DONAGHADEE
CUXHAVEN
Warsaw
HOLYHEAD
BIRR CASTLE
LIVERPOOL
SPURN HEAD
Groningen
BERLIN
NOTTINGHAM
THE HELDER
YARMOUTH
VALENCIA
Breslau
Cassel
Cracow
Lemberg
Nicolaieff
PEMBROKE
ROCHES PT.
OXFORD
BATH
LONDON
CLACTON
DOVER
Flushing
DUNGENESS
BRUSSELS
FRANKFURT
Prague
PORTLAND BILL
C. GRIS NEZ
Odessa
SCILLY
LA HEVE
Vienna
MUNICH
Buda-Pesth
JERSEY
PARIS
Hermannstadt
BREST
Le Mans
Bucharest
BELFORT
LORIENT
Lugano
Trieste
ROCHEFORT
Limoges
LYONS
Turin
Pesaro
Lesina
NICE
Leghorn
Florence
HORTA
Angra
CORUNNA
Bilbao
BIARRITZ
Toulouse
C. Sicié
PERPIGNAN
Rome
SANGUINAIRE
Brindisi
OPORTO
Barcelona
Naples
Patras
Athens
PT DELGADA
Madrid
Cagliari
Palma
LISBON
Palermo
Alicante
Malta
Algiers
Cape De Garde
Tunis
San Fernando
Malaga
GIBRALTAR
Setif
Sfax
Oran
Biskra
Nemours
MADEIRA
Casablanca
Laghouat
25°
20°
15°
10°
5°
0°
5°
10°
15°
20°
25°

Note:—The shaded portions of the Atlantic and Bay of Biscay indicate the areas from which wireless reports were received within 2 hours of the time at which the observations were made. The pecked lines indicate the limits of the areas from which they were received within 24 hours

*Ordnance Survey, Southampton, 1911.*

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The observers are indicated thus :—* Coastguard, † Lightkeepers, [1] S. R. Henderson, [2] F. M. Cotton, C.E., [3] W. J. Woodruff, [4] H. Victor Prigg, [5] Biological Station.

§ Stations marked thus send weekly returns for publication in the Weekly Weather Report.

## LIST OF STATIONS in the COLONIES and DEPENDENCIES and in FOREIGN COUNTRIES from WHICH RETURNS are received in MANUSCRIPT.

NOTE.—Returns received in printed form are not included in this list.

| Station. | Latitude. | Longitude. | Height in Feet above M.S.L. | Order of Station. | Year of Commencement of Observations. | Observer. |
|---|---|---|---|---|---|---|
| MEDITERRANEAN. | ° ′ | ° ′ | | | | |
| Cyprus,* ‡Famagusta ... ... ... | 35 7 N. | 33 57 E. | 34 | II | 1881 | The Chief Medical Officer. |
| " ‡Kyrenia ... ... ... | 35 21 N. | 33 19 E. | 54 | II | 1881 | |
| " ‡Larnaca ... ... ... | 34 55 N. | 33 37 E. | 19 | II | 1881 | |
| " ‡Limassol ... ... ... | 34 40 N. | 33 1 E. | 26 | II | 1881 | |
| " ‡Nicosia ... ... ... | 35 11 N. | 33 22 E. | 493 | II | 1881 | |
| " ‡Papho ... ... ... ... | 34 46 N. | 32 25 E. | 202 | II | 1881 | |
| Gibraltar ... ... ... ... ... | 30 6 N. | 5 21 W. | 48 | II | 1883 | Colonial Secretary's Department. |
| Morocco, ‡Cape Spartel ... ... ... | 35 47 N. | 5 55 W. | 191 | II | 1893 | Edwin C. Hathaway, for Lloyds. |
| " Mogador ... ... ... | 31 30 N. | 9 42 W. | 19 | ● | 1903 | H. B. Johnstone, H.B.M. Vice-Consul. |
| " Saffi ... ... ... ... | †32 17 N. | 9 8 W. | 40 | ● | 1905 | N. A. de Silva. |
| Syria, Beyrout ... ... ... ... | 33 54 N. | 35 28 E. | 172 | II | 1883 | A. S. Kheiri, B.A., for Alfred H. Joy, M.A., Director of the Syrian Protestant College. |
| " | | | | ● § | | |
| Turkey, Smyrna ... ... ... ... | 38 26 N. | 17 9 E. | 50 | III | 1908 | H. Echiboukdjian, for Rev. Alex. MacLachlan, President, International College. |
| AFRICA. | | | | | | |
| Central :— | | | | | | |
| Uganda, Bululu ... ... ... | 1 43 N. | 33 13 E. | 3,518 | III | 1908 | M. T. Dawe, Director of the Scientific Department. |
| " Entebbe .. ... ... | 0 4 N. | 32 28 E. | 3,863 | III | 1896 | |
| " Fort Portal ... ... ... | 0 43 N. | 30 8 E. | 5,299 | III | 1901 | |
| " Gondokoro ... ... ... | 4 51 N. | 31 42 E. | 1,500 | III | 1901 | |
| " Jinja ... ... ... ... | 0 26 N. | 33 11 E. | 3,722 | III | 1901 | |

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* By arrangement with the Colonial Office and the Survey Department of Egypt the returns for these stations are sent in the first instance to the Survey Department for use in connexion with its Monthly Weather Report. They are sent to the Office for ultimate filing.

† The positions and heights of the stations are those given by the observers, except in cases marked †, for which the information given has been obtained from other sources.

‡ The Meteorological instruments in use at this Station are lent by the Meteorological Committee.

§ 9 Rainfall Stations.

## LIST OF STATIONS in the COLONIES, &c., from which RETURNS are received in MANUSCRIPT—*continued.*

| Station. | Latitude. | Longitude. | Height in Feet above M.S.L. | Order of Station. | Year of Commencement of Observations. | Observer. |
|---|---|---|---|---|---|---|
| AFRICA—*continued.* | | | | | | |
| Central—*continued.* | ° ′ | ° ′ | | | | |
| Uganda, Kampala ... ... ... | 0 19 N. | 32 35 E. | 3,905 | III | 1907 | M. T. Dawe, Director of the Scientific Department.<br>Returns have been received also from 22 stations in Uganda which record rainfall only. |
| " Kawolongoja ... ... | 0 24 N. | 32 11 E. | 4,263 | III | 1910 | |
| " Kivuvu Kyagwe ... ... | 0 23 N. | 32 47 E. | ? 3,650 | III | 1910 | |
| " Koba ... ... ... | 2 19 N. | 31 29 E. | — | III | 1907 | |
| " Masaka ... ... ... | 0 21 S. | 31 47 E. | ? 4,200 | III | 1902 | |
| " Masindi ... ... ... | 1 40 N. | 31 50 E. | 3,764 | III | 1906 | |
| " Mbale ... ... ... | 1 2 N. | 34 6 E. | ? 4,000 | III | 1907 | |
| " Mbarara ... ... ... | 0 31 N. | 30 47 E. | 4,500 | III | 1901 | |
| " Nimule ... ... ... | 3 39 N. | 32 10 E. | 2,034 | III | 1903 | |
| West:— | | | | | | |
| Gold Coast, Aburi ... ... ... | 5 50 N. | 0 10 W. | 556 | III | 1893 | Medical Department, Accra. |
| " Accra ... ... ... | †5 35 N. | 0 6 W. | 60 | III | 1893 | |
| " Addah ... ... ... | 5 50 N. | 0 38 E. | — | III | 1895 | |
| " Axim ... ... ... | †4 50 N. | 2 12 W. | — | III | 1895 | |
| " ‡Cape Coast Castle ... | †5 15 N. | 0 30 W. | — | III | 1895 | |
| " Gambaga ... ... ... | †10 31 N. | 0 26 W. | — | III | 1899 | |
| " Kintampo ... ... | 8 5 N. | 1 30 W. | — | III | — | |
| " Kumasi (Coomassie) ... | †6 50 N. | 2 16 W. | 859 | III | 1899 | |
| " Kwitta (Keta) ... ... | †5 59 N. | 0 59 E. | — | III | 1895 | |
| " Sekondi ... ... ... | 5 0 N. | 1 40 W. | 20 | III | 1904 | |
| " Sunyani ... ... ... | 7 22 N. | 2 19 W. | — | III | 1908 | |
| " Tamale ... ... ... | 9 23 N. | 0 50 W. | — | III | 1908 | |
| " Tarkwa (Tarquah) ... | 5 11 N. | 2 0 W. | 245 | III | 1907 | |
| Northern Nigeria:— | | | | | | |
| Bauchi ... ... ... ... ... | 10 17 N. | 9 49 E. | 2,300 | III | 1907 | The Secretariat, Zungeru. |
| Geidam (Dumjeri) ... ... ... | 12 53 N. | 11 57 E. | ? 900 | III | 1907 | |
| Ilorin ... ... ... ... .. | 8 29 N. | 4 32 E. | 968 | III | 1907 | |
| Kano ... ... ... ... ... | 12 0 N. | 8 33 E. | 2,000 | III | 1907 | |
| Katagum ... ... ... ... | 12 17 N. | 10 22 E. | 108 | III | 1907 | |
| Keffi ... ... ... ... ... | 8 50 N. | 7 52 E. | — | III | 1907 | |
| Kontagora ... ... ... ... | 10 24 N. | 5 24 E. | 1,300 | III | 1907 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Lokoja ... ... ... ... ... | 7 48 N. | 6 44 E. | 270 | III | 1907 | The Secretariat, Zungeru. |
| Maifoni (Maiduguri) ... ... ... | 11 48 N. | 13 12 E. | 1,200 | III | 1907 | |
| Sokoto ... ... ... ... ... | 13 1 N. | 5 14 E. | 1,160 | III | 1907 | |
| Yola ... ... ... ... ... | 9 12 N. | 12 30 E. | 850 | III | 1907 | |
| Zaria ... ... ... ... ... | 11 6 N. | 7 43 E. | 2,230 | III | 1907 | |
| Zungeru ... ... ... ... | 9 49 N. | 6 10 E. | 530 | III | 1907 | |
| Sierra Leone ... ... ... ... | 8 30 N. | 13 9 W. | 179 | II | 1895 | The Principal Medical Officer. |
| Southern Rhodesia :— | | | | | | |
| Ringstead Reef (Essexvale) ... ... | 21 0 S. | 29 0 E. | 4,496 | ● | 1908 | Mrs C. E. Fripp. |
| Somaliland— | | | | | | |
| Berbera ... ... ... ... ... | 10 22 N. | 45 2 E. | 30 | III | 1908 | |
| Sheik Camp Hospital ... ... ... | 9 50 N. | 45 16 E. | 4,500 | III | 1908 | |
| Zaila ... ... ... ... ... | — | — | — | III | 1910 | A. W. Soffy. |
| SOUTH AMERICA. | | | | | | |
| British Guiana, Georgetown ... ... | 6 49 N. | 56 10 W. | 0 | ⊙ | 1906 | F. A. Stockdale, Government Botanist. |
| " " Mazaruni (Penal Settlement). | — | — | — | ⊙ | 1908 | |
| Venezuela, Guayanavièjà (El Perú) ... | 7½ 0 N. | 62 0 W. | 1,000? | II B ⊖ | 1910 | Dr. E. H. Griffen, for the Goldfields of Venezuela, Ltd. |
| CHINA. | | | | | | |
| Chinkiang ... ... ... ... ... | 32 13 N. | 119 27 E. | 40 | II ⊙ | 1905 | Capt. Lewis H. Tamplin. |
| NORTH ATLANTIC OCEAN. | | | | | | |
| Bermuda Dockyard ... ... ... | 32 20 N. | 64 51 W. | 30 | — | 1889 | Lieut. C. E. Stainer, R.N. |
| Bahamas, Nassau ... ... ... | †25 2 N. | 77 25 W. | — | III | 1895 | R. W. D. Albury. |
| " ‡*Abaco ... ... ... | 25 51 N. | 77 11 W. | 75 | II | 1859 | G. C. Pinder<br>Lightkeepers, for Board of Trade. |
| " ‡*Cay Lobos ... ... ... | 22 22 N. | 77 35 W. | — | II | 1877 | S. W. Roberts |
| " ‡*Cay Sal ... ... ... | 23 42 N. | 80 25 W. | 40 | II | 1859 | J. A. Thompson |
| " ‡*Inagua ... ... ... | 20 56 N. | 73 41 W. | 40 | II | 1871 | E. J. Jones |
| " ‡*Watling's Island ... ... | 24 8 N. | 74 26 W. | 120 | II | 1889 | J. S. Solomon |
| Barbados .. ... ... ... ... | †13 12 N. | 59 35 W. | 181 | II | 1895 | John R. Bovell, Superintendent Botanical Department. |
| ‡*Sombrero ... ... ... ... | 18 36 N. | 63 28 W. | 34 | II | 1867 | A. L. Richardson, Lightkeeper, for the Board of Trade. |

* Lighthouse ; contributes register containing observations every 4 hours.

† The positions and heights of the stations are those given by the observers, except in cases marked †, for which the information given has been obtained from other sources.

‡ The Meteorological instruments in use at this Station are lent by the Meteorological Committee.

## LIST OF STATIONS in the COLONIES, &c., from which RETURNS are received in MANUSCRIPT—*continued.*

| Station. | Latitude. | Longitude. | Height in Feet above M.S.L. | Order of Station. | Year of Commencement of Observations. | Observer. |
|---|---|---|---|---|---|---|
| SOUTH ATLANTIC OCEAN. | ° ′ | ° ′ | | | | |
| Falkland Islands:— | | | | | | |
| *‡Cape Pembroke ... ... ... | 51 41 S. | 57 42 W. | 70 | II | 1859 | J. Pearce, Lightkeeper, for the Board of Trade. |
| ‡Stanley... ... ... ... ... | — | — | — | ⊙ B | — | His Excellency the Governor. |
| ‡St. Helena; St. Matthew's Vicarage ... | 16 0 S. | 5 40 W. | 1,887 | II | 1885 | A. L. C. Hands. |
| " Central, Oak Bank ... | — | — | 1,696 | ●↗ | 1902 | J. Homagee. |
| " St. Paul's Vicarage ... | — | — | 1,694 | ● | 1905 | Alfred Porter. |
| South Georgia, Grytviken ... ... | 54 14 S. | 36 33 W. | 10 | II | 1906 | R. MacDougall, for the Argentine Fishery Company, transmitted by the Governor of the Falkland Islands through the Board of Trade. |
| PACIFIC OCEAN. | | | | | | |
| British Solomon Islands:— | | | | | | |
| Tulagi ... ... ... ... ... | 9 5 S. | 160 8 W. | 7 | III | 1907 | F. J. Barnett. |
| Fiji:— | | | | | | |
| Suva ... ... ... ... .. | 18 8 S. | 178 0 E. | 44 | II | 1906 | C. H. Knowles, Superintendent Department of Agriculture. |
| Fanning Island ... ... ... ... | 3 54 S. | 159 23 W. | — | III | 1903 | The Pacific Cable Board. |
| Malden Island ... ... ... ... | 3 59 S. | 155 0 W. | — | II | — | Geo. H. Crocker. |
| ‡Ocean Island ... ... ... ... | 0 52 S. | 169 36 E. | 159 | II B. | 1905 | W. H. Knight, for the Pacific Phosphate Company. |
| INDIAN OCEAN. | | | | | | |
| Madagascar:— | | | | | | |
| Antananarivo ... ... ... ... | 18 55 S. | 45 16 E. | — | ● | 1903 | T. P Porter, H.B.M. Consul. |
| Mauritius, Royal Alfred Observatory ... | 20 6 S. | 57 31 E. | 181 | (I) | 1901 | T. F Claxton, Director. |

* Lighthouse; contributes register containing observations every 4 hours.

‡ The Meteorological instruments in use at this Station are lent by the Meteorological Committee.

## K.—List of Publications Issued under the Authority of the Meteorological Committee of the Royal Society (1867 to 1876), the Meteorological Council (1877 to 1905), or the Meteorological Committee appointed by Treasury Minutes, May 20th, 1905, and 31st March, 1910.*

The list is arranged under the following headings :—

1. Reports of the Meteorological Office and of International Meetings.
2. Observations and Data for Stations in the United Kingdom.
3. Observations and Data for Foreign and Colonial Stations.
4. Marine Meteorology, Atlases and Memoirs.
5. Reports of Investigations in Dynamical and Statistical Meteorology and other Memoirs.
6. Handbooks and Text-books.

### 1. Reports of the Meteorological Office and of International Meetings.

Reports of the *Meteorological Committee* of the Royal Society (8vo.) :—
1867–1877. At prices varying from 4*d.* to 1*s.* per Report, except 1876–1877, 3*s.* 5*d.*

Reports of the *Meteorological Council* (8vo.) :—
1878–1905. At prices varying from 5*d.* to 1*s.* 5*d.*, except 1884–5, **4*s.* 4*d.***

Reports of the *Meteorological Committee* (8vo.) :—
1905–06. Price 1*s.* 4*d*
1906–07. „ 1*s.* 7*d.*
1907–08. „ 1*s.* 5*d.*
1908–09. „ 1*s.* 5*d.*
1909–10. „ 1*s.* 10*d.*
1910–11. „ 2*s.* 3*d.*

International Codex of Resolutions adopted at Congresses, Conferences, and at Meetings of the Permanent International Committee 1872–1907 (No. 200). 1*s.* 3*d.* (8vo.)

Reports of Proceedings at International Meetings (8vo.) :—
Leipzig. 1872. (Non-Official, No. 6.) 1*s.*
Vienna. 1873. (No. 21.) 1*s.*
Vienna and Utrecht. 1873 and 1874. (Non-Official, No. 9.) 1*s.* 6*d.*
London. 1874. Maritime Meteorology. (No. 23.) 2*s.*
London. 1876. With Supplement. (Non-Official, No. 11.) 2*s.*
Utrecht. 1878. (Non-Official, No. 13.) 6*d.*
Rome. 1879. (No. 36.) 1*s.* 6*d.*
Berne. 1880. (Non-Official, No. 14.) 1*s.*
Copenhagen. 1882. (Non-Official, No. 15.) 2*s.* 6*d.*
Paris. 1885. (Non-Official, No. 16.) 1*s.* 1896. (No. 127.) 1*s.* 1907. (No. 197.) 1*s.* 6*d.*
Zürich. 1888. (Non-Official, No. 17.) 4*d.*
Munich. 1891. (No. 102.) 1*s.* 6*d.*
Upsala. 1894. (No. 115.) 1*s.*
St. Petersburg. 1899. (No. 148.) 2*s.*
Southport. 1903. (No. 164.) 2*s.*
Innsbruck. 1905. (No. 195.) 2*s.*

Report on Weather Telegraphy and Storm Warnings. 1873. (Non-Official, No. 8.) 6*d.* (8vo.)

Reports . . . on Atmospheric Electricity, Maritime Meteorology, and Weather Telegraphy. 1878. (Non-Official, No. 12.) 2*s.* (8vo.)

Provisional Summary of the Maritime Weather Signals at present in use in the various countries of the Globe. (M.O. 206.) (8vo.)

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* The "Daily Weather Report," "Hourly Readings," and "Meteorological Observations at Stations of the Second Order," can be obtained from the Meteorological Office. The other publications are sold by Messrs. Wyman and Sons, Limited, and other agents for the sale of the publications of H.M. Stationery Office; Annual Reports by Parliamentary Booksellers; Monthly Meteorological Charts and Charts published by the Admiralty are sold by J. D. Potter.

### 2. Observations and Data for Stations in the United Kingdom.

*Daily Weather Report.* Subscription 5*s.* per official quarter. (4to.)

[*]BRITISH METEOROLOGICAL YEAR BOOK from 1908. (4to.)

Part I.—[†]*Weekly Weather Report.* 6*d.* per week. With Appendices priced separately.

Part II.—*Monthly and Annual Supplements:* Monthly Weather Report: summaries of observations from about 200 stations in the British Isles, and charts. 6*d.* each part. Subscription for Parts I. and II. inclusive, including postage, 30*s.* per annum.

Part III.—*Monthly issue of daily observations at Stations of the Second Order and Anemograph Stations.* In parts, January to December, 1908, at 2*s.* each; from January, 1909, completed December, 1910, at 1*s.* 6*d.* each.

Part IV.—*Monthly issue of Hourly Readings at four Observatories in connexion with the Meteorological Office.* In separate parts for each Observatory. 6*d.* each.

*Monthly* Weather Reports (4to):—

1884–1887.[‡] In Monthly Parts 1*s.* 6*d.* to 2*s.* 6*d.* each, except May to December, 1887, which is in wrapper, price 12*s.*

*Quarterly* Weather Report (4to):—

1869–1880. At prices varying from 4*s.* to 10*s.* each Quarterly Part. 1877–1880:—Appendices and Plates are published for these years at 27*s.* or 28*s.* per Yearly set.

[§]*Hourly Readings* from the Self-Recording Instruments at the . . . . Observatories (4to):—

1881–1886. In Parts, varying in price from 10*s.* to 30*s.* each.

1900–1910. 25*s.* each, or 6*d.* per month each station. (*See also* British Meteorological Year Book. Part IV.)

*Hourly Means* (*for Five-days and Calendar months*) of the Readings obtained from the Self-Recording Instruments at the . . . Observatories under the Meteorological Council (4to):—

1887–1899. In Annual Volumes, at prices varying from 15*s.* to 38*s.*

*Meteorological Observations* at Stations of the Second Order (4to):—

[‖]1876–1907. At prices varying from 20*s.* to 35*s.*

1908–1910, 16*s.* each.

(*See also* British Meteorological Year Book. Part III.)

AVERAGES:—

Quinquennial table of averages of Temperature, Rainfall, and Sunshine at Stations in the British Isles. Latest issue, for the period ended 1905 (about 150 Stations). 1*s.* (4to.) Forms Appendix III. to Weekly Weather Report, 1906.

*Rainfall*:—

Diurnal Range of Rain at the Seven Observatories in connexion with the Meteorological Office, 1871–1890. (No. 143. 1900.) 2*s.* 6*d.* (8vo.)

Rainfall Tables of the British Isles for 1866–80. Compiled by G. J. Symons, F.R.S. (No. 47. 1883.) 7*s.* 6*d.* (8vo.)

Rainfall Tables of the British Islands, 1866–90. (No. 114. 1897.) 6*s.* (8vo.)

*Sunshine*:—

Sunshine Records of the United Kingdom for 1881. (No. 56. 1883.) 4*s.* (8vo.)

Ten Years' Sunshine in the British Isles, 1881–90. (No. 98. 1891.) 2*s.* (8vo.)

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[*] The publication of Geophysical data (terrestrial magnetism, atmospheric electricity, seismology and solar radiation) for the Observatories Kew, Eskdalemuir and Valencia, will be published in Parts III. and IV. of the Year Book as from Jan., 1911. The title of the publication will be altered to "The British Meteorological and Magnetic Year Book."

[†] The publication of the Weekly Weather Report began in February, 1878. Annual subscription, including Supplements and Appendices, post paid, 1878–1883, 12*s.* 6*d.*; 1884–1888, 21*s.* 2*d.*; 1889–1910, 30*s.*

[‡] The publication of the Monthly Weather Report was continued after 1887 as a Supplement to the Weekly Weather Report.

[§] For the years 1874–1880 the Hourly Readings were issued in lithographed form. Price 20*s.* per annum. The Hourly Readings for Kew and Valencia are for the years 1895–1900.

[‖] The Observations at Stations of the Second Order for 1873–75 will be found in the Quarterly Weather Report for the respective years.

### 2. Observations and Data for Stations—*continued.*

*Temperature :—*

Temperature Tables for the British Islands. (No. 154. 1902.) 10*s.* 6*d.* Supplement :—Difference Tables for each Five Years for the Extrapolation of Mean Values. 3*s.* (4to.)

ATLAS :—

Meteorological Atlas of the British Isles. (No. 53 1883.) 5*s.* 6*d.* (4to.)

### 3. Observations and Data for Foreign and Colonial Stations.

Contribution to the Meteorology of Japan.—By Staff-Com. Thomas H. Tizard, H.M.S. "Challenger." (No. 28. 1876.) [Out of Print.]

Meteorological Observations at the Foreign and Colonial Stations of the Royal Engineers, and the Army Medical Department, 1852-1886. (No. 83. 1890.) 23*s.*

Meteorological Observations made at Sanchez, Samaná Bay, St. Domingo, 1886–1888.—By the late W. Reid, M.D. (No. 89. 1890.) 8*s.* 6*d.*

Report on the Meteorology of Kerguelen Island.—By Rev. S. J. Perry, S.J., F.R.S. (No. 37. 1879.) 3*s.*

Climatological Observations at Colonial and Foreign Stations :—

I. :—Tropical Africa, 1900–1902, with Summaries and Map.—By E. G. Ravenstein, F.R.G.S. (No. 165. 1904.) 6*s.* (4to.)

### 4. Marine Meteorology, Atlases and Memoirs.

CHARTS :—

*Arabian Sea :—*

Daily Weather Charts for the period of six weeks ending June 25, 1885, to illustrate the tracks of two cyclones in the Arabian Sea. (No. 80. 1891.) 10*s.* (4to.)

*Atlantic :—*

Charts of Meteorological Data for the Nine 10° Squares of the Atlantic, which lie between 20° N. and 10° S., and extend from 10° to 40° W., with accompanying Remarks, ending with the Best Routes across the Equator. (No. 27. 1876.) 24*s.* (17 × 20 ins.)

Monthly Current Charts for the Atlantic Ocean. From information collated and prepared in the Meteorological Office. Published by the Admiralty. (No. 132. 1897.) 10*s.* (22½ × 18 ins.)

*Atlantic (North) :—*

Charts of Meteorological Data for Square 3, Lat. 0°–10° N., Long. 20°-30° W. (20 × 13½ ins.) and Remarks to accompany the Monthly Charts, which show the Best Routes across the Equator for each Month, &c. (17 × 16½ ins.) (No. 20. 1874.) 20*s.*

Charts illustrating the Weather of the North Atlantic Ocean in the Winter of 1898-99. (No. 142. 1901.) 6*s.* 6*d.* [Out of Print.]

Currents and Surface Temperature of the North Atlantic Ocean, from the Equator to Latitude 40° N., for each Month of the Year. With a General Current Chart. (No. 12. 1872.) 2*s.* 6*d.* (4to.)

Discussion of the Meteorology of that Part of the Atlantic lying North of 30° N., for the eleven days ending 8th February, 1870. With Charts. (No. 13. 1872.) 5*s.* (4to.)

Meteorology of the North Atlantic during August, 1873, with 31 Synoptic Charts. (No. 32. 1878.) With book of Charts, 15*s.* (15 × 22 ins.)

Synchronous Weather Charts of the North Atlantic and the adjacent Continents, 1st August, 1882, to 3rd September, 1883. Parts I. to IV. (33 sheets each). (No. 71. 1886.) 17*s.* each Part. (26 × 22 ins.)

*Atlantic (South) :—*

Charts showing the Surface Temperature of the South Atlantic Ocean in each month of the Year. (No. 4. 1869.) 2*s.* 6*d.* (18½ × 12½ ins.)

Wind Charts for the Coastal Regions of South America, from information collated and prepared in the Meteorological Office. Published by the Admiralty. (No. 159. 1902.) 7*s.* (27 × 20½ ins.)

Monthly Wind Charts of the South Atlantic. Published by the Admiralty. (No. 168. 1903.) 6*d.* each. (20 × 27 ins.)

The relation between Pressure, Temperature, and Air Circulation over the South Atlantic Ocean. (No. 177. 1905.) 9*d.* (8vo.)

### 4. Marine Meteorology—*continued.*

CHARTS—*continued.*

*Atlantic, Indian, and Pacific Oceans* :—

Charts showing the Surface Temperature of the Atlantic, Indian, and Pacific Oceans. (No. 59. Second Edition, 1903.) 4*s.* 6*d.* (19¼ × 14½ ins.)

Charts showing the Mean Barometric Pressure over the Atlantic, Indian, and Pacific Oceans. (No. 76. 1887.) 10*s.* 6*d.* Supplementary Chart. 6*d.* (27 × 20¾ ins.)

*Atlantic (North) and Mediterranean* :—

Monthly Meteorological Charts, commencing April, 1901. (No. 149.) 6*d.* each. Subscription for one year, 5*s.* (exclusive of postage). (22 × 30 ins.)

*Indian Ocean* :—

Monthly Current Charts for the Indian Ocean, from information collated and prepared in the Meteorological Office. Published by the Admiralty. (No. 124. 1896.) 7*s.* (20 × 24½ ins.)

Monthly Meteorological Charts of the Indian Ocean and Red Sea. Commencing May, 1906. (No. 181.) 6*d.* each. Subcription for one year, 5*s.* (exclusive of postage). (1906–10, 30 × 22 ins., 1910–11, 30 × 30 ins., 1911–12, 30 × 22 ins.)

*Indian Ocean (North)* :—

Meteorological Charts of the portion of the Indian Ocean adjacent to Cape Guardafui and Ras-Hafún. (No. 92. 1891.) 6*s.* (17½ × 23¾ ins.)

*Indian Ocean (South)* :—

Cyclone Tracks in the South Indian Ocean, from information compiled by Dr. Meldrum, C.M.G., F.R.S. (No. 90. 1891.) [Out of print.]*

Meteorological Charts for the Ocean District adjacent to the Cape of Good Hope, with accompanying Remarks. (No. 43. 1882.) Charts, 25*s.* Remarks, 7*s.* (19¼ × 24 ins.)

*Pacific Ocean* :—

Quarterly Current Charts for the Pacific Ocean, from information collated and prepared in the Meteorological Office. Published by the Admiralty. (No. 134. 1897.) 5*s.* (26½ × 28½ ins.)

Wind Charts for the Coastal Regions of South America, from information collated and prepared in the Meteorological Office. Published by the Admiralty. (No. 159. 1902.) 7*s.* (27 × 20½ ins.)

*Red Sea* :—

Meteorological Charts of the Red Sea. (No. 106. 1895.) 21*s.* (22 × 13½ ins.)

*Southern Ocean* :—

Meteorological Charts of the Southern Ocean between the Cape of Good Hope and New Zealand. (No. 123. 1899.) [New Edition, 1907.] 6*s.* (17¼ × 19½ ins.)

OTHER PUBLICATIONS ON MARINE METEOROLOGY :—

Contributions to our Knowledge of the Meteorology of the Arctic Regions. (Official, No. 34. 1885.) Vol. 1 : Part I., 2*s.*; II., 10*s.*; III., 6*s.*; IV., 5*s.* V., 6*s.* (4to.)

Contributions to our Knowledge of the Meteorology of the Antarctic Regions. (No. 18. 1873.) 2*s.* (4to.)

Contributions to our Knowledge of the Meteorology of Cape Horn and the West Coast of South America. (No. 11. 1871.) 2*s* 6*d.* (4to.)

Notes on the Form of Cyclones in the Southern Indian Ocean.—By C. Meldrum, M.A , F.R.S. (Non-Official, No. 7. 1873.) [Out of print.]

On the Physical Geography of the part of the Atlantic which lies between 20° N. and 10° S. and extends from 10° to 40° W. A Paper read before the British Association at Bristol, in August, 1875.—By Capt. H. Toynbee, F.R.A.S. (Non-Official, No. 10. 1876.) [Out of print.]

On the Winds, &c., of the North Atlantic along the Tracks of Steamers from the Channel to New York. Translated from a Paper issued by the Deutsche Seewarte, Hamburg. (Non-Official, No. 5. 1872.) 6*d.* (8vo.)

Report to the Committee of the Meteorological Office on the Meteorology of the North Atlantic.—By Capt. H. Toynbee, F.R.A.S. (Non-Official, No. 2. 1869.) 1*s.* (8vo.)

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[*] Reproduced upon the Meteorological Charts for the Indian Ocean (No. 181).

### 4. Marine Meteorology—*continued.*

OTHER PUBLICATIONS ON MARINE METEOROLOGY—*continued.*

Report on the Gales experienced in the Ocean District adjacent to the Cape of Good Hope between Lat. 30° and 50° S., and Long. 10° and 40° E.—By Capt. H. Toynbee, F.R.A.S. (No. 44. 1882.) 7*s.* 6*d.* (4to.)

Routes for Steamers from Aden to the Straits of Sunda and back. Translated from a Paper issued by the R. Meteor. Inst. of the Netherlands. (Non-Official, No. 4. 1872.) [Out of print.]

### 5. Reports of Investigations in Dynamical and Statistical Meteorology and other Memoirs.

London Fog Inquiry, 1901–03 :—

Report of the Council, with Report by R. G. K. Lempfert, M.A. 1904. (No. 160. 1904.) 2*s.* 6*d.*

Report by Captain Alfred Carpenter, R.N., D.S.O. (1903.) 2*s.*

Dynamical Meteorology :—

Report on the Storm of October 13–14, 1881.—By Robert H. Scott, F.R.S. (No. 46. 1882.) 1*s.* 6*d.* [Out of print.]

Report of an Inquiry into the Connexion between Strong Winds and Barometric Differences.—By Robert H. Scott. (Non-Official, No. 1. 1868.) 6*d.* (8vo.)

Report to the Committee of the Meteorological Office on the use of Isobaric Curves.—By Capt. H. Toynbee, F.R.A.S. (Non-Official, No. 3. 1869.) [Out of print.]

Barometric Gradient and Wind Force. Report to the Director of the Meteorological Office by E. Gold, M.A., Fellow of St. John's College, Cambridge, Superintendent of Instruments. (No. 190. 1908.) Price 2*s.* 6*d.* (4to.)

Life History of Surface Air Currents. A Study of the Surface Trajectories of Moving Air.—By W. N. Shaw, Sc.D., F.R.S. (Director of the Meteorological Office) and R. G. K. Lempfert, M.A. (No. 174. 1906.) 7*s.* 6*d.* (4to.)

The Free Atmosphere in the Region of the British Isles. Contributions to the Investigation of the Upper Air. (No. 202. 1909.) Price 2*s.* 6*d.* (4to.)

Statistical Meteorology :—

The Beaufort Scale of Wind-force. Report of the Director of the Meteorological Office upon an Inquiry, with a Paper by G. C. Simpson, M.Sc., and Notes by Sir G. H. Darwin, K.C.B., F.R.S., W. H. Dines, F.R.S., and Commander Campbell Hepworth, C.B., R.N.R., Marine Superintendent. (No. 180. 1906.) 1*s.* 6*d.* (4to.)

Harmonic Analysis of Hourly Observations of Air Temperature and of Pressure at British Observatories. (No. 93. 1891.) 12*s.* (4to.)

The Trade Winds of the Atlantic Ocean. Contributions to the Study of the North-East and South-East Trade Winds. (No. 203. 1910.) Price 3*s.* (4to.)

### 6. Handbooks and Text-books. (8vo.)

Barometer Manual. (No. 8. 1871.) [Out of Print.]

Barometer Manual for the Use of Seamen. With an Appendix on the Thermometer, Hygrometer, and Hydrometer. Sixth Edition, extensively Revised. 1909. (No. 61.) 3*d.* A Text Book of Marine Meteorology.

Fishery Barometer Manual. New Edition, 1887. (No. 3.) 6*d.*

Instructions for Meteorological Telegraphy. New Edition, 1906. (No. 2.) Prepared for the use of Observers exclusively.

The Observer's Handbook. A new Edition of Dr. Scott's Instructions in the use of Meteorological Instruments. (No. 191.) 3*s.*

Hints to Meteorological Observers in Tropical Africa, with Instructions for taking Observations, and Notes on Methods of recording Lake Levels. Second Edition, revised 1907. (No. 162.) 9*d.*

FORECASTING :—

Aids to the Study and Forecast of Weather.—By W. Clement Ley, M.A. (No. 40. 1880.) 1*s.*

Principles of Forecasting by means of Weather Charts.—By the Hon. Ralph Abercromby, F.R.Met.Soc. Second Edition, Revised, 1885. (No. 60.) [Out of Print.]

## L.—PUBLICATIONS OF THE INTERNATIONAL METEOROLOGICAL COMMITTEE.

*International Meteorological Tables.* With introduction in French, English and German. Gautier-Villars et Fils, Paris. (4to.) (1890.) 40*s.*

*International Cloud Atlas.*—By H. H. Hildebrandsson and L. Teisserenc de Bort. With introduction in French, English and German, and 14 coloured plates. Gautier-Villars et Fils, Paris. (Second Edition, 1910.) 10*s.*

## APPENDIX III.

LIST of CAPTAINS who have sent in Logs classed as "Excellent" during the year ending March 31, 1911. Figures are attached to the name of each observer to show the number of "Excellent" logs which he has supplied during the whole time of his co-operation with the Office.

| Name of Captain. | Number of "Excellent" Logs. | Ship. |
|---|---|---|
| Bennett, C. D., Comm. R.N.R., R.D. | 16 | S.S. "Macedonia." |
| Carnon, J. R., Lieut. R.N.R. ... | 7 | S.S. "Caledonian." |
| Chudley, T. H., Lieut. R.N.R. ... | 3 | S.S. "Kia Ora." |
| Evans, E. R. G., Lieut. R.N. ... | 1 | S.S. "Terra Nova." |
| Griffiths, A. M. ... ... ... | 4 | S.S. "Hillmere." |
| Grindlay, G. ... ... ... | 2 | S.S. "Crown of Arragon." |
| Hanson, F. W. A., Lieut. R.N.R. ... | 1 | S.S. "Wilcannia." |
| Harris, G. H., Lieut. R.N.R. ... | 15 | S.S. "Gloucestershire."<br>S.S. "Leicestershire." |
| Higgins, C. J. ... ... ... | 6 | S.S. "Macinnes." |
| Kemp, A. H. ... ... ... | 10 | S.S. "Mimiro." |
| Kendall, H. G., Lieut. R.N.R. ... | 1 | S.S. "Montrose." |
| Lingham, W. G., F.R.A.S., F.R. Met. Soc. | 7 | S.S. "Wakool." |
| Lord, S. ... ... ... ... | 1 | S.S. "William Cliff." |
| Mais, E. ... ... ... ... | 3 | S.S. "York Castle." |
| Millican, J. W. ... ... ... | 34 | S.S. "Keyingham." |
| Millington, G. A. ... ... ... | 2 | S.S. "Narrung." |
| Moodie, J. ... ... ... ... | 3 | S.S. "Camphill." |
| Morrison, D. ... ... ... | 5 | S.S. "City of Corinth." |
| Mullan, F.C., F.R.G.S. ... ... | 31 | S.S. "Ramsay." |
| Stanley, W. ... ... ... ... | 1 | S.S. "Derbyshire." |
| Steeves, T. G. ... ... ... | 3 | S S. "Jason." |
| Taylor, L. F., Lieut. R.N.R. ... | 1 | S.S. "Singapore." |
| Weir, A. R. ... ... ... ... | 2 | S.S. "Clan Macleod." |
| Young, G. ... ... ... ... | 6 | S.S. "Clan Macfadyen." |

# APPENDIX IV.

## METEOROLOGICAL REGISTERS received during the Year 1910–11.

### (1.)—*From the* ROYAL NAVY.—*Meteorological Logs* (7).

| H.M. Ship. | Commanding Officer. | Officers Observing. | No. of Registers received. | Duration of Observations. | | Voyage. |
|---|---|---|---|---|---|---|
| | | | | Mths. | Days. | |
| "Egeria," H.M.S. ... | Lieut. Commr. J. D. Nares, R.N. | Lieut. A. F. S. Grant, R.N. ... ... ... | 1 | 7 | 29 | Surveying, British Columbia. |
| "Merlin," H.M.S. ... | F. C. Learmonth, Capt. R.N. | Sub-Lieut. V. I. Griffith, R.N. ... ... | 3 | 8 | 29 | Surveying, China Station. |
| "Mutine," H.M.S. ... | E. C. Hardy, Capt. R.N. | Sub-Lieut. T. Lundholm, R.N. ... ... | 2 | 5 | 9 | Surveying, near Durban. |
| "Odin," H.M.S. ... | F. H. Walter, Commr. R.N. | Surgeon H. D. Drennan, M.B., B.A., R.N.... | 1 | 4 | 0 | Persian Gulf. |
| **(2.)—SPECIAL SERVICE.—*Uncommissioned Ships* (1).** | | | | | | |
| "Worcester." H.M.S. | D. Wilson Barker, Commr. R.N.R., F.R.S.E., F.R.A.S., &c. | Cadets ... ... ... ... ... ... | 1 | 4 | 0 | Off Greenhithe. |

## METEOROLOGICAL REGISTERS received during the Year 1910-11—*continued.*

### (3.)—*From the* MERCANTILE MARINE.—*Meteorological Logs* (328).

| Ship. | Captain. | Officers Observing. | No. of Registere received. | Duration of Observations. | | Voyage. |
|---|---|---|---|---|---|---|
| | | | | Mths. | Days. | |
| "African Prince," S.S. | C. B. Andersson ... | A. T. Allan, H. C. Jefferson ... ... ... | 2 | 6 | 15 | U.S.A., China, *viâ* Suez, Brazil. |
| "Amazon," S.S. | H. E. Rudge ...<br>H. W. Doughty... | C. Willets, T. Burch, R. Lloyd, C. Miller, W. Davis, G. Robinson, A. Mackay, H. Dobson. | 2 | 4 | 26 | Pernambuco. |
| "Amberton," S.S. ... | A. Heron ... ... | T. Stayman, C. O. R. Stephenson, J. Robertson, P. Moorsom. | 2 | 5 | 19 | Monte Video, Cape, Karachi, Home *viâ* Suez, Bahia Blanca. |
| "Arabic," S.S. ... | W. Finch, Lieut. R.N.R. | A. S. Gilbert, Lieut. R.N.R., A. Tyrer, Sub-Lieut. R.N.R., J. M. McCarroro. | 1 | 3 | 10 | New York. |
| "Arctic Stream," Ship | C. C. Dixon ... ... | C. Methven, H. V. Rogers, A. G. Bray ... | 1 | 12 | 12 | Australia, W.C.S.A., Oregon. |
| "Athenic," S.S. ... | C. H. Kempson, Lieut. R.N.R. | W. S. Thornton, Sub-Lieut. R.N.R., P. A. Bell. | 2 | 6 | 0 | New Zealand, *viâ* Capes. |
| "Avon," S.S. ... | L. R. Dickinson ... | R. Dadd, F. C. Cooke, H. T. Buller, O. W. Malet. | 2 | 5 | 0 | New York, West Indies, Colon, Buenos Aires. |
| "Balaena," S.S. ... | J. W. Murray ... ... | ... ... ... ... ... ... ... | 1 | 3 | 10 | Greenland, Whaling. |
| "Balmoral," Ship ... | J. Barr ... ... ... | G. Roberts ... ... ... ... ... | 1 | 7 | 24 | W.C.S.A. |
| "Banca," S.S. ... | A. Collyer ... ... | C. V. S. Bulteel, C. E. Sims, Mid. R.N.R. ... | 1 | 4 | 7 | China, Japan, Bombay, *viâ* Suez. |
| "Bantu," S.S. ... | H. C. Elford ... ... | L. M. Jeune, R. Rinder, A. Matherson ... | 2 | 6 | 1 | Calcutta, Persian Gulf, *viâ* Cape and Suez. |
| "Barranca," S.S. ... | W. Long ... ... ... | A. H. Riseley, W. C. Hake, Sub-Lieut. R.N.R., N. Headley, T. Thwaite. | 2 | 6 | 12 | Central America. |
| "Benlarig," S.S. ... | A. Wallace ... ... | J. M. Hewison, A. D. Hapkirk, N. Leslie ... | 2 | 6 | 26 | China, Japan, Dalny, *viâ* Suez. |
| "Benvenue," S.S. ... | R. Kroble ... ... | C. F. March, W. R. Mackintosh, N. McLeod | 1 | 3 | 20 | Yokohama, *viâ* Suez. |
| "Blackwell," S.S. ... | T. W. Scurr ... ... | J. McGreivy, W. L. Charlton, E. Bush, W. Burnham, R. Mallett. | 3 | 7 | 7 | Calcutta, Rangoon, *viâ* Suez. |

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| "Bostonian," S.S. ... | J. Parry ... ... ... | J. Trickey, J. Arkle, H. Porter, C. Veasey ... | 2 | 7 | 0 | Boston, Mass. |
| "Breconshire," S.S. ... | J. M. Tomlinson ... | G. Kershaw, T. Hughes, E. M. Legge, Sub-Lieut. R.N.R., G. Cochran, J. Todd. | 2 | 10 | 13 | China, Japan, *viâ* Suez. |
| "Bucrania," S.S. ... | A. H. Rayner, Lieut. R.N.R. | F. S. Browne, E. A. Winkworthy, F. L. Cowie. | 1 | 3 | 4 | Calcutta *viâ* Suez. |
| "Caledonian," S.S. ... | J. R. Carnon, Lieut. R.N.R. | R. D. Allinson, L. Mann ... ... ... | 1 | 2 | 15 | U.S.A. |
| "Camphill," S.S. ... | J. Moodie ... ... | J. Horne, J. Johnstone ... ... ... | 2 | 9 | 26 | Australia, *viâ* C.G.H., Norway, Philadelphia, San Francisco, Victoria, *viâ* Cape Horn. |
| "Canadian," S.S. ... | W. H. Bullock, Lieut. R.N.R. | ... ... ... ... ... ... ... | 1 | 3 | 6 | United States. |
| "Carnarvon," S.S. ... | F. J. Lobb, Commr. R.N. | F. W. Holden ... ... ... ... ... ... | 1 | 24 | 2 | Lighthouse tender, Bahamas. |
| "Carpentaria," S.S. ... | E. G. Davis ... ... | ... ... ... ... ... ... ... | 2 | 7 | 17 | Batavia, Australia, *viâ* Cape and Suez. |
| "Catania," S.S. ... | A. S. Gibb, Lieut. R.N.R., R.D. | B. Southcott ... ... ... ... ... | 2 | 6 | 14 | Yachting, Mediterranean and coasts of United Kingdom. |
| "Cayo Soto," S.S. | E. C. Radder ...<br>J. K. Widgery ...<br>H. Davey ... | E. Hawkins ... ... ... ... ... | 1 | 7 | 3 | W.I., Central America, U.S.A |
| "Cheshire," S.S. ... | W. Stanley ... ... | S. Makepeace, C. Stone, E. Tourner, H. Giles, S. A. Hollingsworth, R. Wood. | 2 | 6 | 4 | Rangoon, *viâ* Suez. |
| "China," S.S. ... | E. Street ... ... | C. Birnie, A. C. M. Hoskyn, A. M. Conrade, L. Unicume, A. Keith Yates, N. H. Furber, A. C. Brooke-Webbe, Lieut. R.N.R. | 3 | 7 | 18 | Australia, *viâ* Suez. |
| "Chirripo," S.S. ... | E. H. Jones ... ... | E. West, G. E. Ryan, G. Martin, R. Hobson, T. A. Thwaite, W. B. Davis. | 2 | 8 | 6 | Central America. |
| "Circassia," S.S. ... | C. F. Osborne, Commr. R.N.R., R.D. | — Erskine, — Gemmell, — Chalmers, — Hannan, — Anderson, — Lewis, — Duncan. | 2 | 5 | 13 | Bombay, *viâ* Suez. |
| "City of Calcutta," S.S. | J. R. Rae ... ... | J. McArthur ... ... ... ... ... | 1 | 3 | 18 | Bombay, Calcutta, *viâ* Suez. |
| "City of Corinth," S.S. | D. Morrison ... ... | J. McArthur ... ... ... ... ... | 2 | 4 | 11 | Calcutta, *viâ* Suez. |
| "Clan Buchanan," S.S. | A. W. Simpson ... ... | J. Swanston, R. Mackie, R. P. Elliot, Sub-Lieut. R.N.R., G. Perret, D. Macfarlane, F. Walker, P. Pratt. | 2 | 7 | 22 | Mauritius, Australia, *viâ* Cape and Suez. |
| "Clan Ferguson," S.S. | S. A. Jones ... ... | E. W. Baker, A. Mackinlay, W. F. Brothers | 1 | 3 | 5 | Maulmain, Rangoon, *viâ* C.G.H. and Suez. |

## METEOROLOGICAL REGISTERS received during the Year 1910-11—*continued.*

### (3.)—*From the* MERCANTILE MARINE.—*Meteorological Logs*—continued.

| Ship. | Captain. | Officers Observing. | No. of Registers received. | Duration of Observations. | | Voyage. |
|---|---|---|---|---|---|---|
| | | | | Mths. | Days. | |
| "Clan Forbes," S.S. ... | R. G. Becket ... ... | M. McGower, J. H. Bain, E. C. Whiteford, R. Hocking, F. Pierce, V. S. Armstrong. | 2 | 6 | 6 | East Indies, *viâ* Cape and Suez. |
| "Clan Lindsay," S.S. | W. Harris ... ... | A. H. Young, F. J. Hawley, H. S. Knight, J. Andrews. | 3 | 7 | 6 | Bombay, Calcutta, Madras, *viâ* Suez. |
| "Clan Macfadyen," S.S. | G. Young ... ... | A. Clark, S. B. Watson, T. V. Wilson, R. W. Mackie. | 2 | 7 | 0 | Seychelles, Assumption, Aldabra, East Indies, *viâ* Cape and Suez. |
| "Clan Macfarlane," S.S. | W. H. Price ... ... | D. MacKinnon, P. Hart, T. Hatton, A. R. Hair. | 1 | 4 | 7 | Mauritius, Calcutta, Buenos Aires, *viâ* C.G.H. |
| "Clan Macinnes," S.S. | C. J. Higgins ... ... | T. S. Brocklehurst, E. S. Simpkins, J. B. Young. | 2 | 8 | 16 | East Indies, *viâ* Suez. |
| "Clan Macintosh," S.S. | W. J. Lennox ... ... | — Stenson, — Temple, — Easterbrook, — Jackson, — Butcher, — MacKenzie. | 2 | 7 | 23 | Mauritius, Chittagong, China, *viâ* Cape and Suez. |
| "Clan Macleod," S.S. | A. R. Weir ... ... | W. Roberts, J. Harley ... ... ... | 2 | 5 | 7 | East Indies, *viâ* Suez. |
| "Clan Macneil," S.S. | F. J. Roden, Lieut. R.N.R. | F. R. Elwell, — Lawson, — Morrison, — Andrews, — Shaw. | 3 | 7 | 1 | Calcutta, Bombay, *viâ* Suez. |
| "Clan Urquhart," S.S. | C. Sommerfelt ... ... | — Niell, — Robson, — Letts, — Nicoll, — Jennings. | 2 | 6 | 5 | Mauritius, Saigon, Chittagong, *viâ* Cape and Suez. |
| "Clyde," S.S.... ... | A. P. Dix, Lieut. R.N.R. | ... ... ... ... ... ... ... | 1 | 3 | 9 | West Indies, Colon, New York. |
| "Collingham," S.S. ... | T. A. Tait ... ... | W. F. Beaven, W. H. Metcalf, W. Yeatts ... | 4 | 13 | 11 | Australia, *viâ* C.G.H., U.S.A., St. Thomas, D.W.I., Honolulu, Ocean Id., *viâ* Magellan and Suez. |
| "Counsellor," S.S. ... | W. J. Simmons... ... | A. de Legh, G. R. Windsor, W. A. Hall ... | 1 | 2 | 19 | Gulf of Mexico. |
| "Craighall," S.S. ... | J. Low ... ... ... | W. Stephenson, J. Michie, F. Clements ... | 1 | 4 | 4 | Mauritius, China, *viâ* Cape and Suez. |
| "Crown of Arragon," S.S. | G. Grindlay ... ... | J. A. D. Risk, A. Thomson, N. McCormick, D. M. Matheson. | 3 | 7 | 20 | West Indies, Demerara, Mobile. |
| "Cuthbert," S.S. ... | W. Smale ... ... | S. Clarke, D. J. Williams, A. C. P. Harris ... | 1 | 2 | 28 | West Indies, Para, New York. |

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| "Den of Ogil," S.S. | H. C. Hemming<br>A. White ... | E. Twidle, H. E. Watkins, P. Mortimer, J. W. McMurtrie. | 2 | 9 | 6 | China, Japan, *viâ* Suez. |
| "Derbyshire," S.S. | E. Robin ...<br>W. Stanley ... | F. Beckett, H. Lyons, J. Miller, R. P. Hellet, T. Flinn, S. Makepeace, W. English, R. Wood, J. Merifield. | 3 | 6 | 0 | Rangoon, *viâ* Suez. |
| "Dominic," S.S. ... | W. Smale ... ... | G. Parry ... ... ... ... ... | 2 | 6 | 6 | Para, New York. |
| "Dunbarmoor," S.S. | W. B. Barton ...<br>O. G. Owens ... | J. W. Russell, G. A. S. Sleigh, R. Blake, S. Collins, G. N. Watkins, — Blakey, — Hopper. | 3 | 6 | 25 | East Indies, *viâ* Suez. |
| "Durham Castle," S.S. | T. Chope, Lieut. R.N.R. | A. C. H. Allanby, A. O. Morgan, Lieut. R.N.R., A. H. Blackman, H. M. Hart. | 4 | 8 | 17 | Beira, *viâ* Cape. |
| "East Point," S.S. ... | H. I. Young ... ... | ... ... ... ... ... ... ... | 1 | 2 | 5 | Philadelphia. |
| "Egypt," S.S. ... | F. R. Summers ... ... | S. J. Woodroffe, E. N. Velez, R. S. Ward, Sub-Lieut. R.N.R., B. T. Brooks. | 2 | 6 | 25 | Bombay, *viâ* Suez. |
| "El Argentino," S.S. | W. R. Coleman ... ... | — Driscoll, — Furlong, — Loughlan ... | 1 | 3 | 12 | Buenos Aires. |
| "Empress of China," S.S. | R. Archibald, Commr. R.N.R.<br>W. Davison, Lieut. R.N.R. | F. W. N. Higgens, Lieut. R.N.R., F. C. Plater, Sub-Lieut. R.N.R., A. V. R. Lovegrove, Lieut. R.N.R. | 2 | 7 | 12 | Trans-Pacific, Vancouver, Yokohama. |
| "Empress of India," S.S. | E. Beetham, Lieut. R.N.R.<br>S. Robinson, Lieut. R.N.R. | C. P. Shiel, Sub-Lieut. R.N.R., E. I. Green ... | 2 | 6 | 27 | Trans-Pacific. |
| "Empress of Japan," S.S. | H. Pybus, Commr. R.N.R. | L. D. Douglas, Sub-Lieut. R.N.R., J. W. Harrison, A. H. Bird, Lieut. R.N.R. | 2 | 7 | 8 | Trans-Pacific (N). |
| "Erroll," S.S. ... | G. Graham ... ... | ... ... ... ... ... ... | 1 | 6 | 17 | Japan, *viâ* Suez. |
| "Fulwell," S.S. ... | G. C. Douglas ... ... | R. Mallett, E. F. Newton ... ... ... | 1 | 2 | 22 | Calcutta, *viâ* Suez. |
| "Garryvale," S.S. ... | W. H. McClure ... ... | G. E. Patterson, D. McClegmont, J. W. D. Kearney. | 2 | 7 | 1 | Calcutta, Karachi, *viâ* Suez, Rio Janeiro. |
| "Garth Castle," S.S.... | G. K. Gandy, Commr. R.N.R. | ... ... ... ... ... ... ... | 1 | 0 | 12 | Las Palmas to Ascension. |
| "Georgic," S.S. ... | J. Roberts, Lieut. R.N.R | W. H. G. Yates, G. Davey, Sub-Lieut. R.N.R., A. Allen. | 1 | 2 | 26 | Australia, *viâ* Cape and Suez. |
| "Glamorganshire," S.S. | H. C. Norris ... ... | H. T. Angus, J. W. Maughan, E. E. Sharp | 1 | 3 | 16 | China, Japan, *viâ* Suez. |
| "Glenaffric," S.S. ... | W. Lane ... ... ... | E. E. B. Drake, D. F. Allen, A. S. Jones, C. Donaldson. | 2 | 10 | 0 | Buenos Aires, Cape, Mauritius, Vancouver, China, Japan, Australia, East Indies, *viâ* Suez. |

## METEOROLOGICAL REGISTERS received during the Year 1910-11—*continued.*

### (3.)—*From the* MERCANTILE MARINE.—*Meteorological Logs*—continued.

| Ship. | Captain. | Officers Observing. | No. of Registers received. | Duration of Observations. Mths. | Duration of Observations. Days. | Voyage. |
|---|---|---|---|---|---|---|
| "Glenelg," S.S. ... | A. Hart ... ... ... | D. L. Muirhead, W. J. Brooks, T. Thomas, L. M. McIntyre. | 2 | 7 | 22 | East Indies, Australia, *viâ* Suez and Cape. |
| "Gloucestershire," S.S. | G. H. Harris, Lieut. R.N.R. | F. W. C. Midgley, C. E. Stone, C. Hill, T. Flinn. | 1 | 2 | 6 | Rangoon, *viâ* Suez. |
| "Gryfevale," S.S. ... | J. W. Steele ... ... | B. Collie, G. P. Pearson, P. Jones ... ... | 1 | 2 | 4 | Monte Video. |
| "Herefordshire," S.S. | C. Robin... ... ... | H. Peterson, H. T. Bryce, R. H. A. Dunn, J. Moffatt. | 1 | 2 | 0 | Rangoon, *viâ* Suez. |
| "Hesione," S.S. ... | H. R. C. Lockyer ... | — Duffus, — Bebington, — Coppen ... | 1 | 3 | 15 | Monte Video. |
| "Hesperian," S.S. ... | W. S. Main, F.R.G.S. ... | ... ... ... ... ... ... ... | 2 | 7 | 17 | Canada. |
| "Hillmere," S.S. ... | A. M. Griffiths ... ... | J. Dawson, W. W. Hipkin, G. Spence ... | 2 | 4 | 22 | Rio Janeiro. |
| "India," S.S.... | R. L. Haddock, Commr. R.N.R.<br>H. S. Bradshaw | F. Sudell, Lieut. R.N.R., G. W. Taylor, Sub-Lieut. R.N.R., L. C. Newman, Sub-Lieut. R.N.R., J. F. B. Moody, H. S. L. Farghen. | 2 | 5 | 16 | Bombay, Australia, *viâ* Suez. |
| "Indian Monarch," S.S. | K. P. T. Wood ... ... | F. Ramsay, A. Reay, A. Seeton ... ... | 2 | 6 | 20 | W.C.S.A., Australia, U.S.A. |
| "Ionic," S.S. ... ... | E. C. Roberts ... ... | C. Alexandre, A. E. Bowles ... ... ... | 3 | 8 | 28 | New Zealand, *viâ* Capes. |
| "Jason," S.S.... ... | T. G. Steeves ... ... | G. J. B. Rogers, J. R. Scott, W. R. F. Holden | 2 | 5 | 24 | Australia, *viâ* Cape, China, Japan, *viâ* Suez. |
| "Julia Park," S.S. ... | M. Mackenzie ... ... | J. Thomson ... ... ... ... ... | 1 | 2 | 25 | River Plate. |
| "Kaikoura," S.S. ... | A. W. McKellar, Commr. R.N.R. | — Forde, — Wilde, — Croudace ... | 2 | 5 | 20 | New Zealand, *viâ* Capes. |
| "Kaipara," S.S. ... | N. R. de la C. Cornwall, Lieut. R.N.R. | R. Coyte, W. T. Point, H. Dawson ... ... | 1 | 2 | 28 | New Zealand, *viâ* Capes. |
| "Keyingham," S.S. ... | J. W. Millican ... ... | J. Tweedie, A Thompson, S. L. Bezer ... | 1 | 6 | 13 | River Plate, West Indies, U.S.A., Colon. |
| "Kia Ora," S.S. ... | T. H. Chudley, Lieut. R.N.R. | R. S. Lewis, W. Kershaw, J. Gaskell, E. Clements. | 2 | 5 | 23 | New Zealand, *viâ* Capes. |

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| "Kincraig," S.S. ... | A. G. Reid ... ... | E. Bossaers, G. S. Paterson, P. S. Bailey ... | 1 | 2 | 27 | East Indies, *viâ* Suez. |
| "Kintail," S.S. ... | D. G. Griffiths ... ... | G. Gillanders, R. G. Sturrock, L. G. Wiseman. | 2 | 8 | 14 | Rio Janeiro, Australia, *viâ* Cape, Calcutta, Karachi, Japan, Home, *viâ* Suez. |
| "Kumara," S.S. ... | A. Morton ... ... | L. S. Solomon, J. Fisher, J. Wilson, C. Beresford. | 2 | 5 | 29 | New Zealand, Australia, *viâ* Capes. |
| "Lake Michigan," S.S. | H. Parry ... ... | W. C. Bannerman ... ... ... ... | 1 | 3 | 24 | Canada. |
| "Laurentic," S.S. ... | B. F. Hayes, Commr. R.N.R., R.D. | H. T. Hall, — Shaw, A. S. Gilbert, Lieut. R.N.R. | 2 | 6 | 8 | East Coast, North America. |
| "Leander," S.S. ... | H. R. Ketley ... ... | J. H. Williams, T. Williams ... ... ... | 2 | 7 | 3 | Black Sea, Monte Video. |
| "Le Coq," S.S. | F. W. Peterson ...<br>J. A. Mein ... | A. S. Leech, Lieut. R.N.R., J. A. Mein, J. Marris. | 2 | 8 | 2 | Black Sea, New York. |
| "Leicestershire," S.S. | G. H. Harris, Lieut. R.N.R. | — Blanshard, — Bryce, — Smardon, — Wood, — Kershaw. | 2 | 4 | 3 | Rangoon, *viâ* Suez. |
| "Macduff," S.S. ... | C. H. Burch ... ... | — Clark, — Gray, — Binder ... ... | 1 | 4 | 13 | East Indies, China, Reunion, Saigon, *viâ* Suez. |
| "Macedonia," S.S. | J. D. Andrews, Commr. R.N.R., R.D.<br>C. D. Bennett, Commr. R.N.R., R.D. | G. G. Randell, A. H. Ayres, Sub-Lieut. R.N.R., E. P. Lyndon. | 3 | 7 | 20 | Bombay, Shanghai, Australia, *viâ* Suez. |
| "Magdalena," S.S. ... | W. H. B. Trigge, Lieut. R.N.R. | J. Pope ... ... ... ... ... ... | 2 | 5 | 14 | West Indies, New York. |
| "Malta," S.S. ... | G. M. Montford, Commr. R.N.R., R.D. | L. D. Pinckney, F. T. Groome, Sub-Lieut. R.N.R., L. J. Edwards, Mid. R.N.R. | 1 | 2 | 0 | Calcutta, *viâ* Suez. |
| "Manchester Commerce," S.S. | W. P. Couch ... ... | E. Davis, J. Henderson, H. Cookson ... | 1 | 3 | 12 | Philadelphia. |
| "Manchester Corporation," S.S. | P. J. Heath ...<br>E. Cabot ... | H. Wilkinson, E. Cabot, F. Clough, F. Chester. | 2 | 5 | 27 | U.S.A. |
| "Manchester Exchange," S.S. | T. A. Adamson ... ... | E. M. Mitchell, T. A. Brooks, C. L. Whorrel, R. Smith, R. G. Stokes, W. Date, T. Parks. | 2 | 6 | 27 | U.S.A. and Canada. |
| "Manica," S.S. ... | F. O. Potts ... ... | E. W. Manship, M. T. McCrae, E. L. Carter, W. S. Payn. | 2 | 8 | 16 | Bassein, Australia, East Indies, *viâ* Cape and Suez. |
| "Manistee," S.S. ... | W. T. Forrester... ... | L. H. Sinclair, J. M. Isaacson, R. A. Thorburn, Sub-Lieut. R.N.R., W. B. Woodward, A. Newitt, F. J. Downs. | 2 | 7 | 7 | Santa Marta. |
| "Marathon," S.S. | W. J. Burge ...<br>A. Robb ... ...<br>P. J. Collins ... | H. C. Allingham, Sub-Lieut. R.N.R., J. Poate, B. Rutt, E. Legge. | 2 | 5 | 2 | Australia, *viâ* Cape. |

## METEOROLOGICAL REGISTERS received during the Year 1910–11—*continued.*

### (3.)—*From the* MERCANTILE MARINE.—*Meteorological Logs*—continued.

| Ship. | Captain. | Officers Observing. | No. of Registers received. | Duration of Observations. Mths. | Days. | Voyage. |
|---|---|---|---|---|---|---|
| "Marere," S.S. ... | T. B. Linklater ... | P. E. Mells, F. A. Renaut, R. S. Durham, F. G. Williams, N. S. Marks, R. J. A. Harding, — Duncan. | 3 | 8 | 20 | New Zealand, Australia, *viâ* Capes. |
| "Mascotte," Barque... | G. B. Serra ... .. | ... ... ... ... .. ... ... | 1 | 3 | 20 | Monte Video. |
| "Matina," S.S. | A. E. Johnson ...<br>F. H. Swain ... | A. E. Johnson, L. H. Sinclair, V. F. Sizer, A. D. Young. | 2 | 6 | 6 | Santa Marta. |
| "Meinwen," Barque... | R. H. Potter, F.R. Met. Soc. | J. Rowlands, J. Hammett, H. Morgan ... | 1 | 9 | 25 | Australia, Iquique, *viâ* Capes. |
| "Miami," S.S. | J. H. H. Scudamore, Lieut. R.N.R.<br>E. W. Castle ...<br>J. Clark ... ...<br>A. E. Johnson ... | R. B. Drake, D. R. Cooke, A. N. Newitt, N. H. Sinclair, W. G. Preece, W. Walsh, J. Martin, F. A. V. McArthur, O. Pitts, R. Hobson, W. B. Woodward. | 3 | 8 | 12 | Port Limon, Santa Marta. |
| "Minia," S.S. ... | W. G. S. De Carteret ... | J. Adams, P. D. Baker, J. N. Tinniswoode, F. Rayment. | 2 | 11 | 23 | Cable work, N.A. |
| "Monarch," S.S. ... | J. Wrake ... ... | E. R. Hutchons, Sub-Lieut. R.N.R., G. H. Flavel, Lieut. R.N.R., S. G. Gorton. | 2 | 6 | 9 | Cable laying, United Kingdom. |
| "Monkstone," S.S. ... | S. W. Decent ... ... | F. Foley, W. Williams, S. J. Williams, J. G. Dodds. | 1 | 6 | 23 | Mediterranean, Baltic, South America. |
| "Monmouth," S.S. | H. G. Kendall, Lieut. R.N.R.<br>W. M. Davidson | W. T. Williams, J. Milburn, W. Russell, T. A. Towers, R. K. Watkins. | 3 | 7 | 21 | Canada. |
| "Montrose," S.S. ... | H. G. Kendall, Lieut. R.N.R. | W. Russell, R. G. Steele, R. G. Mowatt, J. Dixon. | 1 | 3 | 26 | Quebec. |
| "Mooltan," S.S. | W. H. P. Sweny, Lieut. R.N.R., R.D.<br>R. L. Haddock, Commr. R N.R. | H. A. Monro, J. M. Tickell, E. S. McLeod, Lieut. R.N.R., R. Muirhead, E. H. Orchard, Lieut. R.N.R., R. J. Hamlin, Sub-Lieut. R.N.R., H. Gwyn. | 3 | 8 | 3 | New Zealand, Australia, *viâ* Suez. |
| "Morning," S.S. ... | W. Adams ... ... | ... ... ... ... ... ... ... | 1 | 4 | 20 | Greenland, Whaling. |

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| "Musician," S.S. ... | G. B. Woolfenden ... | S. S. Ward, E. J. Williams, J. W. Gill, J. Rae, H. G. Mitchell. | 2 | 6 | 4 | West Indies, Gulf of Mexico, United States. |
| "Narrung," S.S. ... | G. A. Millington ... | G. F. Ward, N. E. Ritson, D. L. Hulton, J. V. Harvey, T. C. Bayard, G. Alex. | 2 | 7 | 3 | Australia, *viâ* Cape. |
| "Ness," S.S. ... ... | T. McWilliams ... ... | A. Montague, H. Sargent, R. Loughnan ... | 1 | 1 | 22 | Bahia, Halifax, N.S. |
| "Nicoya," S.S. ... | S. H. Simmons ... ... | W. J. Geh, W. Brimecombe, T. A. Thwaite, H. Willoughby, H. Elliott, J. W. Gallop, W. E. Lindop, F. J. Downs, W. A. H. Kelsall, H. S. Daniel, Mid. R.N.R. | 2 | 7 | 20 | Port Limon. |
| "Niwaru," S.S. ... | H. Hollis ... ... | S. C. Cottell, W. G. Higgs, F. C. Greenwood, C. H. Curtis, T. B. Beal. | 2 | 7 | 21 | New York, Australia, New Zealand, *viâ* C.G.H. and Suez. |
| "Nonsuch," S.S. ... | A. G. Alston, Commr. R.N. | J. Goulding, A. Dalby, N. Oswald, H. Cooper | 2 | 6 | 13 | South America, India, *viâ* Cape and Suez, River Plate. |
| "Nubia," S.S. ... | F. J. Fox ... ... | A. Keith-Yates, H. S. Tanner, W. A. Baker, Sub-Lieut. R.N.R., R. Stuart, H. Williams. | 3 | 9 | 22 | Calcutta, Japan, *viâ* Suez. |
| "Olympia," S.S. | A. Tait ... ...<br>W. Robertson ... | G. S. Salmon ... ... ... ... ... | 2 | 7 | 10 | Bombay, *viâ* Suez. |
| "Omrah," S.S. | W. S. Shelford, Lieut. R.N.R.<br>H. G. Staunton, Lieut. R.N.R. | C. D. Matheson, Lieut. R.N.R., G. Parsons, R. C. Glazebrook, Lieut. R.N.R., W. de M. Baynham, Lieut. R.N.R., H. A. Deane, Sub-Lieut. R.N.R., H. G. Thompson, Lieut. R.N.R., R. M. Ward, Lieut. R.N.R. | 3 | 7 | 4 | Australia, *viâ* Suez. |
| "Opawa," S.S. | V. C. White Parsons, F.R.Met.Soc.<br>J. J. Cameron, Lieut. R.N.R. | A. Smith, W. Nicholls, R. Wright, L. Upton | 2 | 5 | 25 | New Zealand, *viâ* Capes. |
| "Ophir," S.S. ... | H. G. Staunton, Lieut. R.N.R., F.R.Met.Soc. | R. W. I. Marshall, Sub-Lieut. R.N.R., H. V. Hart, Lieut. R.N.R., H. Phillips, Lieut. R.N.R., F.R.Met.Soc., R. B. Thomson, Lieut. R.N.R. | 2 | 4 | 20 | Australia, *viâ* Suez. |
| "Orari," S.S. ... ... | J. P. Forsdick ... ... | — Hyde, — Willis, — Barnett, — Moffatt, — Hamilton. | 2 | 5 | 25 | New Zealand, *viâ* Capes. |
| "Ormuz," S.S. ... | P. N. Layton, Lieut. R.N.R. | G. R. Renshaw, Lieut. R.N.R., S. L. Simner, Lieut. R.N.R., C. A. Bullock, Lieut. R.N.R., R. A. Dearden. | 2 | 4 | 22 | Australia, *viâ* Suez. |
| "Orontes," S.S. ... | J. F. H. Healey, Lieut. R.N.R., R.D. | H. D. Groom, H. Stephens, E. Edgar ... | 1 | 2 | 5 | Australia, *viâ* Suez. |

## METEOROLOGICAL REGISTERS received during the Year 1910-11—*continued.*

### (3.)—*From the* MERCANTILE MARINE.—*Meteorological Logs*—continued.

| Ship. | Captain. | Officers Observing. | No. of Registers received. | Duration of Observations. | | Voyage. |
|---|---|---|---|---|---|---|
| | | | | Mths. | Days. | |
| "Orsova," S.S. ... | D. R. W. Parsons, Lieut. R.N.R. | F. R. O'Sullivan, Sub-Lieut. R.N.R., J. N. Jones. W. Gordon-Bennett, Sub-Lieut. R.N.R., W. C. Weston, H. C. Brewster, Lieut. R.N.R. | 3 | 7 | 3 | Australia, *viâ* Suez. |
| "Orvieto," S.S. | J. F. Ruthven, A.I.N.A., F.R.G.S., &c.<br>W. S. Shelford, Lieut. R.N.R. | P. A. Rayner, R. W. I. Marshall, Sub-Lieut. R.N.R., A. L. Owens, Sub-Lieut. R.N.R., M. J. Sarson, C. J. R. Webb, Sub-Lieut. R.N.R., G. G. Thorne, T. Taylor, R. B. Thomson, Lieut. R.N.R. | 3 | 6 | 19 | Australia, *viâ* Suez. |
| "Osterley," S.S. ... | W. J. Jenks, Lieut. R.N.R. | ... ... ... ... ... ... ... | 4 | 10 | 12 | Australia, *viâ* Suez. |
| "Otaki," S.S. ... ... | L. G. Silba ... ... | P. C. Crawford, W. Field-Hook, C. P. Cotton-Stapleton, Lieut. R.N.R., and B. Hodges. | 1 | 2 | 25 | New Zealand, *viâ* Capes. |
| "Otranto," S.S. ... | A. J. Coad, Commr. R.N.R. | H. G. C. Adams, J. J. Hayes, Lieut. R.N.R., W. C. Harrison, E. E. Smith. | 3 | 7 | 3 | Australia, *viâ* Suez. |
| "Otway," S.S. ... | F. S. Symons ... ... | J. L. Marshall, Sub-Lieut. R.N.R., J. C. Collie, Sub-Lieut. R.N.R. | 3 | 6 | 20 | Australia, *viâ* Suez. |
| "Ovid," S.S. ... ... | L. Cubitt ... ... | W. E. Thomas, T. Dawe ... ... ... | 1 | 3 | 5 | St. Paul de Loanda, Black Sea. |
| "Pacuare," S.S. ... | J. H. H. Scudamore, Lieut. R.N.R. | R. B. Drake, R. A. Thorburn, Sub-Lieut. R.N.R., G. P. Parkinson, E. A. Brown. | 2 | 6 | 8 | Central America. |
| "Palma," S.S. ... | G. W. Cockman, Commr. R.N.R., R.D. | P. L. Sandberg, R. Braithwaite, F. Horton, A. H. Simpson, F. Sudell, Lieut. R.N.R., S. Chapman, J. Elliott, B. Worthington, S. Steel. | 2 | 7 | 24 | Japan, *viâ* Suez |
| "Peerless," S.S. ... | H. Cook, C. Vickers, J. Williams. | C. Vickers, J. Young ... ... ... ... | 2 | 6 | 8 | Buenos Aires, Bombay, *viâ* Cape and Suez. |
| "Pembrokeshire," S.S. | R. Hayes ... ... | H. W. Robson, F. L. Tongue, A. E. Gudgeon, B. K. Berry, Mid. R.N.R., B. J. Davies. | 2 | 7 | 8 | China, Japan, *viâ* Suez |

| | | | | | | |
|---|---|---|---|---|---|---|
| "Pera," S.S. ... ... | W. W. N. Cooke, Lieut. R.N.R. | C. D. Forbes, Lieut. R.N.R., F. W. Bowhill, Sub-Lieut. R.N.R., W. A. Cotching. | 1 | 3 | 16 | Calcutta, Japan, Australia, *viâ* Suez. |
| "Persic," S.S. ... | W. F. Morgan, Lieut. R.N.R. | G. Steele, P. C. Finnie ... ... ... | 2 | 5 | 14 | Australia, *viâ* Suez. |
| "Polycarp," S.S. ... | O. L. Beck, Commr. R.N. | — Williams, — May, — Symons, A. Forbes-Mackay. | 1 | 5 | 15 | East Coast, N. and S. America. |
| "Port Antonio," S.S. | A. C. Selfe, Lieut. R.N.R. | G. A. Griffin, C. L. Woollard, Lieut. R.N.R., J. N. Rodick, Sub-Lieut. R.N.R. | 1 | 0 | 28 | Jamaica. |
| "Port Jackson, Barque | C. Maitland ... ... | ... ... ... ... ... ... ... | 1 | 6 | 27 | Australia, *viâ* Capes. |
| "Port Kingston," S.S. | O. Jones... ... ... | A. McC. Pakenham, Sub-Lieut. N.N.R., A. W. Legge. | 2 | 7 | 18 | Jamaica. |
| "Port Royal," S.S. ... | A. C. Selfe, Lieut. R.N.R. | G. A. Griffin, C. L. Woollard, Lieut. R.N.R., J. N. Rodick, Sub.-Lieut. R.N.R., W. J. Tomkins. | 2 | 6 | 11 | Jamaica. |
| "Potosi," S.S. ... | A. T. D. Pearson ... | — Pape, — Kite, — Jones ... ... ... | 2 | 9 | 25 | W.C.S.A., *viâ* Magellan. |
| "Ramsay," S.S. ... | F. C. Mullan, F.R.G.S.... | R. Bailey, J. L. Durkee, A. S. Thomas ... | 2 | 5 | 8 | Bombay, Philadelphia, *viâ* Suez, Rio Janeiro, St. Lucia, New Orleans. |
| "Reventazon," S.S. | J. Clark ... ...<br>J. G. Parsons ... | B. McInnes, J. W. Gallop, J. R. Gorin, G. Petheram, R. Smith, G. G. Parkinson. | 2 | 6 | 1 | Santa Marta, Port Limon. |
| "Rewa," S.S. ... ... | A. W. Mann ... ... | F. G. Bright, T. Hall, F. H. Beaching ... | 1 | 3 | 16 | Singapore, Karachi, *viâ* Suez. |
| "Rimutaka," S.S. | R. C. Clifford ...<br>E. T. Smith, Lieut. R.N.R. ... | D. Gordon Stables, A. McKinstry, H. R. Hamilton, S. L. Soady. | 2 | 5 | 27 | New Zealand, *viâ* Capes. |
| "River Clyde," S.S. | A. J. A. Mann ...<br>J. Kerr ... ... | G. Spencer, J. Maxwell, J. R. Fleming ... | 1 | 8 | 0 | Buenos Aires, Australia, British Columbia, New Zealand, China, *viâ* Cape. |
| "Ryde," S.S. ... ... | W. G. Diver ... ... | J. Turner, J. Granger ... ... ... | 1 | 6 | 2 | West Indies, U.S.A., Baltic, Buenos Aires. |
| "Saxon Prince," S.S. | W. S. Jameson ... ... | R. Milliken, J. Smith, R. H. Hamilton ... | 1 | 2 | 25 | U.S.A., Monte Video. |
| "Scotia," S.S. ... | T. Robertson ... ... | W. S. R. Robertson ... ... ... ... | 1 | 4 | 5 | Greenland, Whaling. |
| "Segura," Ship ... | J. Davies ... ... | ... ... ... ... ... ... ... | 1 | 7 | 14 | Iquique. |
| "Shadwell," S.S. ... | W. H. Knox ... ... | A. Brewis, C. C. Lee, J. W. Pettigrew, J. E. Masters. | 3 | 7 | 16 | Calcutta, *viâ* Suez. |
| "Shira," S.S.... ... | J. Cann ... ... ... | W. Evans, E. Jones ... ... ... ... | 2 | 5 | 3 | Bassein, Trieste, Poti, *viâ* Suez, River Plate. |
| "Singapore," S.S. ... | L. F. Taylor, Lieut. R.N.R. | J. V. Simpson, H. Dixon, J. Martin ... | 3 | 6 | 27 | W.C.S.A. *viâ* Magellan, West Indies, U.S.A., Bahia Blanca, Civita Vecchia. |

## METEOROLOGICAL REGISTERS received during the Year 1910–11—*continued.*

## (3.)—*From the* MERCANTILE MARINE.—*Meteorological Logs*—continued.

| Ship. | Captain. | Officers Observing. | No. of Registers received. | Duration of Observations. Mths. | Days. | Voyage. |
|---|---|---|---|---|---|---|
| "Suevic," S.S. ... | C. E. Starck, Lieut. R.N.R. | F. F. Steele, A. Pawley, Sub-Lieut. R.N.R. | 3 | 6 | 23 | Australia, *viâ* Cape. |
| "Suffolk," S.S. ... | P. Davies ... ... | F. Blacker, L. V. Gard, S. Sharp ... ... | 1 | 2 | 15 | Australia, *viâ* C.G.H. and Suez. |
| "Tagus," S.S. | W. G. Mason ...<br>C. Laws ... ... | R. H. Kitson, W. Dawson, W. Bishop ... | 2 | 6 | 22 | West Indies, Colon, New York. |
| "Terra Nova," S.S. ... | E. R. G. Evans, Lieut. R.N. | Lieut. H. L. L Pennell, R.N., Lieut. V. Campbell, R.N., Lieut. H. Rennie, R.N., Lieut. H. R. Bowers, R.I.M., F. Drake, Paymaster, R.N. | 1 | 3 | 10 | Cape and Melbourne. |
| "Tintagel Castle," S.S. | W. W. Verrall, Lieut. R.N.R. | H. B. S. Beresford, Lieut. R.N.R. ... ... | 1 | 1 | 16 | C.G.H. |
| "Tongariro," S.S. | I. A. Sutcliffe ...<br>V. C. W. Parsons | A. E. Rivers, P. J. Ballard, J. G. Holmes, A. Smith. | 2 | 5 | 27 | New Zealand, *viâ* Capes. |
| "Ultonia," S.S ... | D. S. Miller ... ... | F. J. R. Gardner, Lieut. R.N.R., W. Cooper, C. Fitzsgerald, B. H. Davies, Sub-Lieut. R.N.R. | 2 | 6 | 19 | Naples, New York. |
| "Volga," S.S. ... | D. B. Marshall ... ... | J. S. Gemmell, W. Martin, W. Hunter ... | 2 | 7 | 10 | U.S.A., China, Australia, *viâ* Cape. |
| "Waimate," S.S. ... | J. J. Cameron, Lieut. R.N.R. | ... ... ... ... ... ... ... | 1 | 3 | 15 | New Zealand, *viâ* Capes. |
| "Waipara," S.S. ... | J. S. Hutchison, Commr. R.N.R., R.D. | G. M. Rowe, L. Broadbent, R. W. Webster... | 1 | 3 | 9 | Australia, *viâ* Capes. |
| "Wakool," S.S. ... | W. G. Lingham, F.R.A.S., F.R.Met.Soc. | N. E. Ritson, R. H. Ashby, H. E. Carson, F. N. Somerville. | 2 | 8 | 10 | Australia, *viâ* C.G.H. |
| "Wandsworth," S.S.... | W. H. Bloomfield ... | A. C. Bucknell, W. J. Hall ... ... ... | 1 | 3 | 23 | South America, West Indies, United States, Nova Scotia. |
| "Waverley," S.S. ... | H. R. Wheatley ... | R. Robertson, P. Henderson, P. Frazer ... | 2 | 5 | 9 | Mediterranean, United States, West Indies, Gulf of Mexico. |
| "Whakarua," S.S. ... | A. H. Kemp ... ... | J. C. Clayton, W. C. Whelpton, H. Beale ... | 1 | 2 | 27 | Australia, New Zealand, *viâ* Capes. |
| "Whakatane," S.S. ... | F. A. Hemming ... | R. R. Neale, G. Makepeace, H. L. Upton, H. E. Martin, — Hedham, — Furlong. | 2 | 6 | 24 | Montreal, Australia, New Zealand, *viâ* Suez and Cape Horn. |

## METEOROLOGICAL REGISTERS received during the year 1910–11—*continued.*

### (3.) *From the* MERCANTILE MARINE—*Meteorological Logs*—continued.

| Ship. | Captain. | Officers Observing. | No. of Registers received. | Duration of Observations. | |
|---|---|---|---|---|---|
| | | | | Mths. Days. | Voyage. |
| "Wiloannia," S.S. ... | F. W. A. Hanson, Lieut. R.N.R. | A. Grove, T. C. Bayard, W. T. Williams, D. E. Hotchkins. | 2 | 7 18 | Australia, *viâ* Cape. |
| "William Cliff," S.S. | S. Lord ... ... ... | A. O'Neill, E. H. Havard, G. McKay, F. H. Fairley. | 2 | 4 21 | West Indies, Gulf of Mexico. |
| "Winkfield," S.S. ... | M. J. Jones ... ... | F. Carter ... ... ... ... ... | 1 | 3 19 | Mexillones, Savannah, *viâ* Magellan. |
| "York Castle," S.S. ... | E. Mais ... ... ... | F. A. Smyth, W. Williams, H. R. Northwood, J. Bishop, R. Plowman, — Beckh, — Pace. | 2 | 5 13 | U.S.A., Cape, Mauritius, Beira. |
| "Zent," S.S. ... | J. G. Parsons ...<br>J. Clarke ...<br>S. H. Simmons ...<br>J. H. H. Scudamore, Lieut. R.N.R. | G. Petheram, R. H. Smith, G. D. V. Creagh, O. Pitts, D. McInnes, R. H. Sinclair, W. G. Preece, A. B. Hardy, E. T. Grayston, — Parsons. | 3 | 9 3 | Port Limon. |

### (4.)—ABBREVIATED METEOROLOGICAL REGISTERS.

### (a.) *From the Royal Navy* (—).

### (b.) *From the Mercantile Marine* (9).

| Ship. | Captain. | Officers Observing. | No. of Registers received. | Duration of Observations. | Voyage. |
|---|---|---|---|---|---|
| | | | | Mths. Days. | |
| "Arana," S.S. ... | R. Walton ... ... | W. B. Richardson, W. P. Ashton ... ... | 7 | 5 0 | Mediterranean. |
| "Jeanne d'Arc," S.S. | T. Ring ... ... ... | L. Fors ... ... ... ... ... ... | 1 | 2 4 | Durban, Kerguelen, Durban. |
| "Moresby," S.S. ... | F. J. Bayldon, Lieut. R.N.R. | ... ... ... ... ... ... ... | 1 | 0 19 | Trans-Pacific (S). |

## METEOROLOGICAL REGISTERS received during the year 1910–11 —*continued.*

## (5.)—NORTH ATLANTIC REGISTERS—FORM NO. 121 (1,806).
## INDIAN OCEAN REGISTERS—FORM NO. 122 (293).
## RADIOTELEGRAPHY REGISTERS—FORM NO. 138 (662).

Ships from which Radiotelegraphy Registers have been received are shown by the symbol †.

| Line. | Ship. | Captain and No. of Registers. |
|---|---|---|
| Allan | Corinthian | A. Rennie, 12. |
| | †Corsican | D. Tannock<br>E. Cook<br>37. |
| | Grampian | J. M. Johnston<br>J. W. Williams<br>17. |
| | †Hesperian | W. S. Main, F.R.G.S.<br>J. Williams<br>24. |
| | Hibernian | A. J. Peters, 1. |
| | Ionian | B. T. Eastaway, 18. |
| | Mongolian | J. Williams<br>G. Hamilton<br>A. J. Peters<br>7. |
| | Numidian | T. Moar, 20. |
| | Pomeranian | J. Henderson, 15. |
| | Pretorian | E. Pitts, Commr. R.N.R., R.D., 9. |
| | Sardinian | B. Henry<br>G. Hamilton<br>17. |
| | Siberian | J. Hall<br>J. Williams<br>3. |
| | Sicilian | W. Wallace<br>D. Tannock<br>3. |
| | †Tunisian | J. A. Fairfull, 22. |
| | †Victorian | E. Outram, 38. |
| | †Virginian | A. H. Vipond<br>E. Cook<br>J. T. Gambell<br>24. |
| American | Friesland | C. J. Rogers<br>J. Evans<br>12. |
| | Haverford | J. H. A. Thornton, 12. |
| | Merion | J. B. Hill, 10. |
| | †New York | W. J. Roberts, 9. |
| | †Philadelphia | A. R. Mills, 27. |
| | †St. Louis | J. C. Jamison, 31. |
| | †St. Paul | F. M. Passow<br>W. J. Roberts<br>23. |
| Anchor | Algeria | P. McLean, 7. |
| | †Caledonia | W. Baxter, 32. |
| | †California | J. Blaikie, 36. |
| | †Columbia | F. H. Wadsworth, 12. |
| | Elysia | A. Haig, 4. |
| | †Furnessia | J. Black, 47. |
| | Olympia | A. Tait<br>W. Robertson<br>G. Mitchell<br>16. |
| | Scindia | W. Kelso, 17. |
| Atlantic Transport | Mackinaw | O. P. Clarke, 7. |
| | Manhattan | W. Johnston, 4. |
| | Maryland | J. McMath<br>E. Finch, Lieut. R N.R.<br>6. |
| | Mesaba | O. P. Clarke<br>F. O. Hasker<br>E. Finch, Lieut. R.N.R.<br>15. |
| | †Minneapolis | F. H. Claret, Lieut. R.N.R.<br>F. O. Hasker<br>27. |

METEOROLOGICAL REGISTERS received during the year 1910–11 —*continued.*

| Line. | Ship. | Captain and No. of Registers. |
|---|---|---|
| **Atlantic Transport—** *cont.* | †Minnehaha | F. H. Claret, Lieut. R.N.R., 12. |
| | Minnesota | G. L. Goudie<br>F. W. Lazell } 8. |
| | †Minnetonka | E. G. Cannons, 33. |
| | †Minnewaska | T. F. Gates, 36. |
| | Mobile | J. T. J. Wylie, 12. |
| | Montana | P. Laverock, 11. |
| Austin Friars S.S. Co. | Haileybury | G. H. Sheppard, 14. |
| Bibby | Leicestershire | G. H. Harris, Lieut. R.N.R., 12. |
| | Gloucestershire | G. H. Harris, Lieut. R.N.R., 5. |
| Booth | Anselm | A. MacKenzie<br>A. W. Stoker } 10. |
| | Boniface | R. G. Williamson, 7. |
| Bowring, C. T. & Co. | Brika | E. E. Cooper, 3. |
| Bristol "City" | Chicago City | W. M. Hunter, 4. |
| British and Burmese | Martaban | W. Duguid, 12. |
| | Chanda | J. C. Tice, 10. |
| British India | Colaba | J. Robertson, Lieut. R.N.R., 8. |
| | Culna | S. Maclachlan, Lieut. R.N.R.<br>J. Farquharson } 14. |
| British Sun Co. | British Sun | H. A. Hayns, 2. |
| Brocklebank | Malakand | T. G. Legg, 12. |
| Bucknall | Buceros | J. Hutcheon<br>W. Keasley } 2. |
| | Karonga | R. Leslie, 6. |
| | Kasenga | A. W. Dobbs, 2. |
| | Katuna | A. Lee, 14. |
| | Koranna | J. H. Beare, 11. |
| Butterfield and Swire | Ningpo | T. W. Pickard, 11. |
| Cairn | Bellona | D. M. Ross, 1. |
| | Devona | D. R. Murray, 15. |
| | Fremona | J. Cunningham, 10. |
| | Jacona | O. Grund, 6. |
| Canadian Northern S.S. Co. | Royal Edward | W. Roberts, 15. |
| | Royal George | J. Harrison, 9. |
| Canadian-Pacific Railway Co. | †Empress of Britain | J. A. Murray, 49. |
| | †Empress of Ireland | J. V. Forster, Lieut. R.N.R., 38. |
| | †Lake Champlain | G. S. Webster, Lieut. R.N.R., 33. |
| | †Lake Erie | F. Carey<br>H. G. Kendall, Lieut. R.N.R. } 16. |
| | †Lake Manitoba | G. C. Evans, 23. |
| | †Lake Michigan | H. Parry, 22. |
| | †Monmouth | W. M. Davidson, 21. |
| | †Montcalm | C. W. Hodder, 27. |
| | †Montezuma | J. Gillies<br>E. Griffiths, Lieut. R.N.R. } 21. |
| | †Montfort | A. E. Moscrop, Lieut. R.N.R.<br>W. M. Davidson } 12. |
| | †Montreal | R. H. McNeill, 20. |
| | †Montrose | H. G. Kendall, Lieut. R.N.R., 3. |
| | †Mount Royal | E. Griffiths, Lieut. R.N.R., 3. |
| | †Mount Temple | J. H. Moore, 22. |
| Clan | Clan Macintosh | W. J. Lennox, 25. |
| Clyde S.S. Co. | Spithead | E. C. Tuckwell, 1. |
| "Crown" S.S. Co. | Crown of Navarre | A. McKillop, 6. |
| Cunard | Brescia | G. W. Melsom, Sub-Lieut. R.N.R.<br>C. Morison } 8. |
| | †Campania | R. C. Warr, 20. |
| | †Carmania | J. C. Barr<br>D. Dow, Commr. R.N.R., R.D. } 24. |

METEOROLOGICAL REGISTERS received during the year 1910-11 —*continued.*

| Line. | Ship. | Captain and No. of Registers. |
|---|---|---|
| Cunard—*cont.* | †Caronia | D. Dow, Commr. R.N.R., R.D.<br>T. Potter<br>J. C. Barr 32. |
| | Carpathia | C. A. Smith, Commr. R.N.R., R.D., 14. |
| | Cypria | E. G. Diggle, Lieut. R.N.R., 9. |
| | Franconia | C. A. Smith, Commr. R.N.R., R.D., 1. |
| | †Ivernia | W. Prothero<br>T. Potter 27. |
| | †Lusitania | J. T. W. Charles, Commr. R.N.R., R.D., 32. |
| | Lycia | H. N. Goulden, Lieut. R.N.R., 9. |
| | †Mauretania | W. T. Turner, 13. |
| | Pannonia | W. R. D. Irvine, Commr. R.N.R.<br>A. H. Rostron, Lieut. R.N.R., R.D. 5. |
| | Pavia | H. M. Benison, Lieut. R.N.R., 4. |
| | Phrygia | C. Morrison<br>R. Capper, Lieut. R.N.R. 5. |
| | †Saxonia | E. H. Pentecost, Commr. R.N.R.<br>A. H. Rostron, Lieut. R.N.R., R.D.<br>H. M. Benison, Lieut. R.N.R. 21. |
| | Thracia | D. P. Thomson, Commr. R.N.R., R.D., 2. |
| | Tyria | W. B. Cresser, Lieut. R.N.R., 6. |
| | Ultonia | D. S. Miller, Lieut. R.N.R.<br>G. W. Melsom, Sub-Lieut. R.N.R. 13. |
| | Veria | G. F. Jeffries, 8. |
| Danish | Dania | P. Petersen<br>A. V. Lindberg 12. |
| | Granaria | P. Poulsen, 4. |
| Doddington S.S. Co. | Clinton | J. H. Needler, 3. |
| Dominion | †Canada | R. O. Jones, 38. |
| | Cornishman | E. Maddox, 3. |
| | †Dominion | W. L. Mendus, 21. |
| | Southwark | W. Moorhouse. 2. |
| | Welshman | T. Howell, 16. |
| Elder, Dempster | Port Antonio | W. R. Rowe, F.R. Met. Soc., 4. |
| | Port Henderson | W. R. Rowe, F.R. Met. Soc., 2. |
| | Port Kingston | O. Jones, 16. |
| | Port Royal | A. C. Selfe, Lieut. R.N.R.<br>W. R. Rowe, F.R. Met. Soc. 10. |
| Elders & Fyffes | Barranca | W. Long<br>E. W. Castle<br>S. H. Simmons 11. |
| | Manistee | W. T. Forrester, 12. |
| | Matina | F. H. Swain, 14. |
| | Miomi | E. W. Castle<br>A. E. Johnson 10. |
| | Nicoya | S. H. Simmons<br>E. W. Castle 16. |
| | Pacuare | J. H. H. Scudamore, Lieut., R.N.R.<br>W. T. Forrester 16. |
| | Reventazon | J. Clarke<br>J. G. Parsons 10. |

## METEOROLOGICAL REGISTERS received during the year 1910-11 —*continued.*

| Line. | Ship. | Captain and No. of Registers. |
|---|---|---|
| Elders & Fyffes—*cont.* | Tortuguero | J. G. Parsons, 2. |
| | Zent | J. G. Parsons<br>J. Clarke<br>J. H. H. Scuddamore, Lieut. R.N.R.<br>10. |
| Ellerman | City of Athens | W. Knaut, 6. |
| | City of Benares | A. J Elliott, 7. |
| | City of Manchester | H. Findlay, 9. |
| Elswick S.S. Co. | Elswick Grange | G. Wilson, 11. |
| English & American Shipping Co. | Gafsa | G. Boulter, 8. |
| | Pola | W. R. Bennett<br>H. Hughes<br>6. |
| Glenroy S.S. Co. | Glenroy | S. Freeman, 3. |
| Gulf Transport | Imani | S. C. Penberthy, 4. |
| | Imaum | G. Wigdahl, 3. |
| | Indore | G. Wigdahl, 3. |
| | Inkula | E. A. Alcide, 9. |
| | Inkum | W. E. Price, 5. |
| | Irak | A. Delargy, 1. |
| | Iran | T. B. Peabody, 1. |
| | Istrar | C. M. M. Jacob<br>W. J. Rosewarne<br>10. |
| Hall Line | Rydal Hall | C. Nelson, 1. |
| | Trentham Hall | T. Field, 4. |
| H.M.S. | Terror | B. H. Fanshawe, Capt. R.N., 28. |
| Harrison | Artist | E. T. Sawyer, 2. |
| | Author | G. N. Kearne, 6. |
| | Civilian | G. Goldman, 5. |
| | Counsellor | P. Lord, 1. |
| | Custodian | D. G. Cownie, 8. |
| | Historian | H. H. Pyle, 12. |
| | Huntsman | C. S. Rhodes, 11. |
| | Logician | F. E. Westhorpe, 1. |
| | Matador | J. McMullen, 1. |
| | Orator | F. E. Westhorpe<br>H. C. T. Melling<br>8. |
| | Tactician | R. Owen, 7. |
| Henderson, P. | Amarapoora | J. Reid, 2. |
| Hogarth S.S. Co. | Baron Fairlie | J. Farfor, 1. |
| | Baron Minto | T. Baillie, 2. |
| "Hurona" S.S. Co. | Hurona | D. Ritchie, 12. |
| Indian S.S. Co. | Orwell | D. C. Horne, 4. |
| (Italian) | Silverstream | D. Garziano, 3. |
| Kish S.S. Co. | Simonside | — Pick, 3. |
| Laing S.S. Co. | Langdale | F. R. Clarke, 4. |
| Leyland, F. | Almerian | E. Cook, 2. |
| | Antillian | W. Japha, 10. |
| | Armenian | J. Jacobsen, 1. |
| | Asian | W. E. Wood, 2. |
| | Atlantian | A. H. Highton, 7. |
| | Barbadian | C. H. Manning, 6. |
| | Bohemian | R. McCullum, 10. |
| | Belgian | G. Williams, 9. |
| | Caledonian | J. R. Carnon, Lieut. R.N.R., 10. |
| | Californian | B. Bruce<br>W. Hannaford<br>3. |
| | Cuban | W. Masters, 5. |
| | Iberian | T. B. Jago, 10. |
| | Indian | B. Bruce, 1. |
| | Jamaican | J. H. Kay, 3. |
| | Meltonian | A. Parker, 3. |
| | Michigan | S. W. Watkins, 6. |

## METEOROLOGICAL REGISTERS received during the year 1910–11 —*continued.*

| Line. | Ship. | Captain and No. of Registers. |
|---|---|---|
| Leyland, E.—*cont.* | Oxonian | W. T. Dickinson<br>J. A. Baker } 9. |
| | Philadelphian | R. D. George, 3. |
| | Victorian | E. C. Hiscoe, 1. |
| Macandrew, R. | Arana | R. Walton, 14. |
| Macbeth & Co. | Camphill | J. Moodie, 1. |
| Manchester Liners | Manchester Corporation. | P. J. Heath<br>E. Cabot } 15. |
| | Manchester Engineer | E. W. Beggs, 2. |
| Mercantile S.S. Co. | Boyne | S. G. Dale, 3. |
| | Lena | H. J. Charters, 5. |
| Orient Line | †Otranto | A. J. Coad, Commr. R.N.R., 2. |
| Peninsular and Oriental. | Assaye | O. Jones, Commr. R.N.R., R.D., 11. |
| | Banca | A. Collyer, Lieut. R.N.R., 9. |
| | Caledonia | W. Hayward, Lieut. R.N.R., 7. |
| | Egypt | F. R. Summers, 17. |
| | Malta | G. M. Montford, Commr. R.N.R., R.D., 7. |
| | Mongolia | C. F. Preston, Commr. R.N.R., 7. |
| | Nile | E. P. Martin, Lieut. R.N.R., 16. |
| | Pera | W. W. Cooke, Lieut. R.N.R., 1. |
| | Persia | W. H. Haughton, Commr. R.N.R., 12. |
| | Salsette | H. G. H. Lewellin, Lieut. R.N.R., 12. |
| Prince | Black Prince | J. Thomas, 5. |
| | British Prince | P. A. Johnston, 1. |
| | Norman Prince | W. E. Barrett<br>H. G. V. Smith } 4. |
| | Ocean Prince | W. E. Barrett, 1. |
| | Saxon Prince | W. S. Jameson, 6. |
| | Welsh Prince | A. B. W. Sheppard, Lieut. R.N.R., 6. |
| Pyman S.S. Co. | Waverley | H. R. Wheatley, 10. |
| Red Star | †Finland | J. C. C. Moller<br>J. S. Ball } 19. |
| | †Kroonland | J. C. C. Moller<br>T. Bradshaw } 11. |
| | †Lapland | H. Doxrud, 24. |
| | †Vaderland | T. G. Barman, 43. |
| | †Zeeland | J. S. Ball<br>J. Mathias, Lieut. R.N.R. } 8. |
| Rotterdam Lloyd | Goentoer | M. van der Putte, 12. |
| | Kediri | W. R. C. van der Meer, 3. |
| | Tambora | W. Bagchus, 13. |
| Royal Mail Steam Packet Co. | Tyne | R. A. Ellis, 1. |
| Simpson, Spence and Young. | Crown Point | J. C. Walker, 11. |
| Star | Star of Canada | J. M. Hart, . |
| Stoomvaart Maatschappij Nederland. | Grotius | J. Teensma, 4. |
| | Java | J. Alberts, 3. |
| | Prinses Juliana | J. Teensma, 2. |
| | Sindoro | G. Van Leeuwen, 10. |
| | Vondel | J. Teensma<br>J. Alberts<br>J. R. de Brouwers } 12. |
| Thomson, W. | Benarty | J. D. Sarchet<br>W. Hastie } 9. |
| | Bengloe | W. A. Guy, 8. |
| | Benvenue | R. Kroble, 6. |
| Trechmann S.S. Co. | Wilster | T. Martin, 5. |

## METEOROLOGICAL REGISTERS received during the year 1910–11 —*continued.*

| Line. | Ship. | Captain and No. of Registers. |
|---|---|---|
| Tyzack & Branfoot S.S. Co. | Camberwell ... ... | J. F. Henderson, 1. |
| Union-Castle ... | Galeka ... ... ... | T. H. Wilford, 8. |
| White Star ... ... | †Adriatic ... ... ... | E. J. Smith, Commr. R.N.R., R.D., 38. |
| | Afric ... ... ... | J. Stivey, Lieut. R.N.R., 4. |
| | †Arabic ... ... ... | W. Finch, Lieut. R.N.R., 25. |
| | †Baltic ... .. ... | J. B. Ranson, Lieut. R.N.R., 17. |
| | Bovic ... ... ... | J. J. Kearney, Lieut. R.N.R., 8. |
| | †Cedric ... ... | C. A. Bartlett, Commr. R.N.R., R.D.<br>H. Smith, Lieut. R.N.R.<br>15. |
| | †Celtic ... ... ... | A. E. S. Hambelton, Lieut. R.N.R., 35. |
| | Cretic ... ... ... | J. B. Kelk, 6. |
| | †Cymric ... ... ... | F. B. Howarth, Commr. R.N.R., R.D., 20. |
| | †Laurentic ... ... | B. F. Hayes, Commr. R.N.R., R.D. 8. |
| | †Majestic ... ... ... | F. E. Beadnell, Lieut. R.N.R., 27. |
| | †Megantic ... | H. S. Smith, Lieut. R.N.R.<br>F. E. Beadnell, Lieut. R.N.R.<br>28. |
| | †Oceanic ... ... ... | H. J. Haddock, C.B., R.D., Commr. R.N.R., 12. |
| | Romanic... ... | H. F. David, Commr. R.N.R., R.D., 14.<br>J. O. Carter, Commr. R.N.R.<br>14. |
| | Runic ... ... ... | G. R. Metcalfe, Lieut. R.N.R., 1. |
| Wilson, T. ... ... | Aleppo ... ... ... | H. Bradley, 2. |

## NUMBER OF REPORTS TRANSMITTED BY RADIOTELEGRAPHY FROM TRANSATLANTIC LINERS.

### 1st April, 1910, to 31st March, 1911.

| Line. | Ship. | Apr. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Year. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Allan. | Corsican ... | 7 | 7 | 4 | 6 | 3 | 8 | 2 | — | 3 | 7 | 8 | 6 | 61 |
| | Tunisian ... | 8 | 8 | 8 | 7 | 7 | 12 | 9 | 7 | 10 | 1 | 8 | 4 | 89 |
| | Victorian ... | 8 | 6 | 14 | 7 | 8 | 7 | 8 | 8 | 4 | — | — | 4 | 74 |
| | Virginian ... | 7 | 3 | 3 | 6 | 3 | — | — | — | — | — | — | — | 22 |
| | Scotian ... | — | — | — | — | — | — | — | — | — | — | — | 5 | 5 |
| | Hesperian ... | — | — | — | — | — | — | — | — | — | — | 3 | 6 | 9 |
| | Corinthian ... | — | — | — | — | — | — | — | — | — | — | — | 4 | 4 |
| | Mongolian ... | — | — | — | — | — | — | — | — | — | — | — | 1 | 1 |
| American. | New York ... | 8 | 8 | 9 | 10 | 11 | 10 | 8 | 7 | 4 | 3 | — | — | 78 |
| | Philadelphia | 8 | 8 | 9 | 8 | 10 | 13 | 8 | 5 | 6 | 6 | — | — | 81 |
| | St. Louis ... | 12 | 14 | 14 | 15 | 11 | 10 | 12 | 6 | 3 | 7 | 2 | 11 | 117 |
| | St. Paul .. | 4 | 8 | 9 | 12 | 8 | 7 | 7 | 11 | 5 | 12 | 9 | 8 | 100 |
| | Haverford ... | — | — | — | — | — | — | — | — | — | — | — | 11 | 11 |
| Anchor. | Caledonia ... | 10 | 11 | 8 | 6 | 7 | 9 | 10 | 9 | 7 | 3 | 8 | 7 | 85 |
| | California ... | 7 | 11 | 11 | 8 | 8 | 8 | 10 | 7 | 8 | 5 | 5 | 11 | 99 |
| | Columbia ... | 6 | 7 | 3 | 7 | 4 | 5 | 9 | 9 | 5 | 3 | 8 | 13 | 79 |
| | Furnessia ... | 7 | 12 | 7 | 14 | 9 | 11 | 8 | 10 | 6 | 5 | 8 | 10 | 97 |
| Atlantic Transport. | Minneapolis... | 9 | 11 | 8 | 10 | 11 | 9 | 11 | 9 | 4 | 10 | 9 | 6 | 107 |
| | Minnehaha ... | 1 | Ship disabled | | | — | — | 1 | 8 | 10 | 9 | 4 | 5 | 38 |
| | Minnetonka... | 5 | 9 | 7 | 13 | 9 | 7 | 9 | 9 | 5 | 7 | 8 | 9 | 97 |
| | Minnewaska | 8 | 10 | 9 | 8 | 9 | 9 | 8 | 8 | 14 | 5 | 6 | 10 | 104 |

## Number of Reports Transmitted by Radiotelegraphy from Transatlantic Liners—*cont.*

### 1st April, 1910, to 31st March, 1911—*cont.*

| Line. | Ship. | Apr. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Year. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Canadian Pacific Railway Company's. | Empress of Britain. | 10 | 7 | 7 | 8 | 8 | 11 | 8 | 7 | 7 | 5 | 9 | 12 | 99 |
| | Empress of Ireland. | 10 | 7 | 7 | 7 | 4 | 9 | 6 | 8 | 8 | 5 | 6 | 9 | 86 |
| | Lake Champlain. | — | 9 | 14 | 9 | 9 | 6 | 1 | — | 1 | — | — | 7 | 56 |
| | Lake Erie | — | — | — | — | — | — | — | 12 | — | — | — | — | 12 |
| | Lake Manitoba | 7 | 4 | 7 | 6 | 5 | 10 | 17 | 11 | 5 | — | — | 3 | 78 |
| | Lake Michigan | 5 | 7 | 11 | 5 | 11 | 5 | 7 | 7 | — | — | 3 | 14 | 75 |
| | Montfort | — | 9 | 4 | 5 | 9 | 4 | 9 | 4 | — | — | 7 | 6 | 57 |
| | Montreal | 6 | 6 | 8 | 5 | 9 | 6 | 4 | 3 | 4 | 3 | 6 | — | 60 |
| | Montrose | — | — | 6 | 7 | 7 | 14 | 6 | 6 | — | — | — | 5 | 51 |
| | Montcalm | 7 | 10 | 9 | 4 | 9 | 8 | 6 | 7 | 6 | — | — | — | 66 |
| | Monmouth | — | — | 14 | 6 | 12 | 14 | 3 | 5 | 7 | 7 | — | — | 68 |
| | Mount Temple | 6 | 10 | 3 | 5 | 11 | 7 | 13 | 5 | 6 | 6 | 6 | 6 | 84 |
| | Montezuma | 6 | 13 | — | 11 | 5 | 12 | 6 | 4 | 8 | 12 | — | — | 77 |
| | Mount Royal | — | 4 | 5 | — | — | — | — | — | — | — | — | — | 9 |
| Cunard. | Campania | 6 | 7 | 9 | 5 | 13 | 10 | 6 | 7 | 6 | 11 | 7 | 3 | 90 |
| | Carmania | — | — | 1 | 4 | 1 | 3 | 2 | 2 | — | — | — | — | 13 |
| | Caronia | 8 | 8 | 9 | 10 | 7 | 8 | 7 | 4 | 8 | 4 | — | 6 | 79 |
| | Ivernia | 8 | 8 | 7 | 6 | 3 | 6 | 9 | 13 | — | 6 | 4 | 8 | 78 |
| | Lusitania | 9 | 8 | 6 | 9 | 9 | 5 | 8 | 6 | 3 | 9 | 7 | 9 | 88 |
| | Mauretania | 6 | 9 | 4 | 8 | 7 | 12 | 6 | 9 | 9 | 3 | 11 | 6 | 90 |
| | Saxonia | — | 7 | 7 | — | — | 7 | 2 | — | 4 | — | — | — | 27 |
| Dominion. | Canada | 11 | 10 | 3 | 2 | 3 | 8 | 6 | 7 | 5 | 6 | 7 | 9 | 77 |
| | Dominion | 11 | 11 | 10 | 11 | 9 | 5 | 16 | 5 | — | 9 | 5 | — | 92 |
| Red Star. | Finland | 11 | 9 | 9 | 8 | 7 | 7 | 13 | 5 | 4 | 5 | 6 | 13 | 97 |
| | Kroonland | 11 | 8 | 10 | 14 | 8 | 9 | 8 | 5 | 9 | 5 | 6 | 10 | 103 |
| | Vaderland | 10 | 10 | 8 | 9 | 10 | 8 | 10 | 5 | 5 | 10 | 11 | 10 | 106 |
| | Zeeland | — | — | 5 | 9 | 16 | 9 | 8 | 10 | 7 | — | — | — | 64 |
| | Lapland | 13 | 9 | 9 | 11 | 13 | 9 | 14 | 7 | 11 | 5 | 5 | 11 | 113 |
| White Star. | Adriatic | 7 | 7 | 7 | 8 | 12 | 7 | 7 | 6 | 7 | 6 | 7 | 8 | 89 |
| | Arabic | 2 | 7 | 7 | 6 | 7 | 4 | 9 | 5 | 5 | 3 | — | — | 55 |
| | Baltic | 12 | 14 | 13 | 12 | 10 | 10 | 7 | 10 | 10 | 3 | 13 | 9 | 124 |
| | Cedric | 3 | 3 | 6 | 4 | — | 4 | 1 | 3 | 2 | — | — | — | 26 |
| | Celtic | 9 | 15 | 13 | 16 | 17 | 15 | 13 | 10 | 4 | 4 | — | — | 116 |
| | Cymric | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | Majestic | 3 | 12 | 6 | 6 | 7 | 6 | 9 | 6 | 3 | — | — | — | 58 |
| | Oceanic | 9 | 8 | 7 | 5 | 7 | 6 | 5 | 7 | 8 | 9 | 7 | 4 | 82 |
| | Teutonic | — | 5 | 2 | — | — | — | — | — | — | — | — | — | 7 |
| | Laurentic | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | Megantic | 13 | 10 | 9 | 17 | 12 | 12 | 13 | 11 | — | 10 | 8 | 10 | 125 |
| | Canopic | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | Cretic | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| | Romanic | — | — | — | — | — | — | — | — | — | — | — | — | 0 |
| Orient. | Otranto | — | — | — | — | — | 5 | 6 | — | — | — | — | — | 11 |

# APPENDIX V.

## INSTRUMENTS supplied, &c., to the MERCANTILE MARINE.

| Particulars. | Barometers. | Thermometers. | Hydrometers. | Screens. |
|---|---|---|---|---|
| April 1st, 1910, afloat ... ... ... | 206 | 1,170 | 780 | 210 |
| Issued since ... ... ... ... | 53 | 390 | 193 | 40 |
| | 259 | 1,560 | 973 | 250 |
| Returned since ... ... ... | 67 | 350 | 174 | 37 |
| | 192 | 1,210 | 799 | 213 |
| Written off as lost, &c. ... ... ... | — | 190 | 170 | 35 |
| April 1st, 1911, afloat ... ... ... | 192 | 1,020 | 629 | 178 |

## DISPOSITION of MERCANTILE MARINE INSTRUMENTS, April 1st, 1911.

| Particulars. | Barometers. | Thermometers. | Hydrometers. | Screens. |
|---|---|---|---|---|
| In merchant ships ... ... ... | 192 | 1,020 | 629 | 178 |
| ,, store at M.O. ... ... ... ... | 8 | 8 | 12 | 12 |
| At Liverpool Agency ... ... ... | 2 | 29 | 22 | 4 |
| ,, Glasgow ,, ... ... ... | 8 | 52 | 29 | 7 |
| ,, Dundee ,, .. ... ... | 4 | 18 | — | 2 |
| ,, Hull ,, ... ... ... | 4 | 26 | 15 | 7 |
| ,, Cardiff ,, ... ... ... | — | 6 | 8 | 2 |
| ,, Southampton ,, ... ... ... | 6 | 16 | 27 | 7 |
| ,, Sunderland ,, ... ... ... | 2 | 9 | 7 | 3 |
| Total, April 1st, 1911 ... ... | 226 | 1,184 | 749 | 222 |
| Under repair, April 1st, 1911 ... ... | 6 | 9 | — | 6 |

## INSTRUMENTS at STATIONS, viz.: Telegraphic Reporting Stations, Observatories, Fishing Villages, &c.

### (*a*.) THERMOMETERS AND SCREENS.

| — | Thermometers. | | | | | |
|---|---|---|---|---|---|---|
| | Ordinary. | Maximum. | Minimum. | Solar. | Grass Minimum. | Screens. |
| April 1st, 1910, in use ... | 379 | 77 | 72 | 10 | 12 | 119 |
| Issued since ... ... | 40 | 5 | 5 | 1 | 1 | 5 |
| | 419 | 82 | 77 | 11 | 13 | 124 |
| Returned since ... ... | 21 | 2 | 4 | — | — | 1 |
| Written off .. ... ... | — | — | — | — | — | 1 |
| April 1st, 1911, in use ... | 398 | 80 | 73 | 11 | 13 | 122 |

### (*b.*) OTHER INSTRUMENTS.

| — | Barometers. | Aneroids and Barographs. | Sunshine Recorders. | Rain Gauges. | Anemometers. | Storm Signal Cones. |
|---|---|---|---|---|---|---|
| **April 1st, 1910, in use ...** | **320** | **36** | **37** | **99** | **31** | **223** |
| **Issued since ... ...** | **7** | **3** | **1** | **4** | **1** | **12** |
| | **327** | **39** | **38** | **103** | **32** | **235** |
| **Returned since ... ...** | **7** | **—** | **2** | **2** | **2** | **—** |
| **Written off ... .. ...** | **—** | **—** | **—** | **—** | **—** | **10** |
| **April 1st, 1911, in use ...** | ***320** | **39** | **36** | **101** | **30** | **225** |

*** 225 barometers (mercurial) and 1 barograph are lent for the use of seafaring communities at fishing villages and ports.**

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STOCK ACCOUNT of INSTRUMENTS received and issued on repayment to the Crown Agents for the Colonies, Colonial Governments, and other Observers, from 1st April, 1910, to 31st March, 1911.

| — | Thermometers. | | | | | Thermograph. | Stevenson's Screens. | Tropical Screens. |
|---|---|---|---|---|---|---|---|---|
| | Ordinary. | Maximum. | Minimum. | Solar. | Grass Min. | | | |
| Stock, April 1st, 1910 | 33 | 9 | 14 | 5 | 12 | 12 | 1 | 8 |
| Received since ... | 676 | 180 | 183 | 64 | 35 | 22 | 21 | 1 |
| | 709 | 189 | 197 | 69 | 47 | 34 | 22 | 9 |
| Issued since ... | 590 | 166 | 184 | 64 | 40 | 33 | 16 | 3 |
| Stock, April 1st, 1911 | 119 | 23 | 13 | 5 | 7 | 1 | 6 | 6 |

| — | Barometers. | | Rain-gauges. | 8 inch glasses. | 5 inch glasses. | Sunshine Frames. | Sunshine Balls. | Cones. | Hygrographs. |
|---|---|---|---|---|---|---|---|---|---|
| | Mercurial. | Graphs. | | | | | | | |
| Stock, April 1st, 1910 | 5 | 1 | 21 | 13 | 10 | 8 | 6 | 5 | 1 |
| Received since ... | 49 | 36 | 148 | 360 | 204 | 3 | 9 | 25 | 3 |
| | 54 | 37 | 169 | 373 | 214 | 11 | 15 | 30 | 4 |
| Issued since ... | 44 | 37 | 156 | 361 | 203 | 7 | 10 | 18 | 3 |
| Stock, April 1st, 1911 | 10 | — | 13 | 12 | 11 | 4 | 5 | 12 | 1 |

In addition, the following miscellaneous instruments were received and issued during the period :—

1 Dines Recording Anemometer.
2 Small Registering Anemometers.
1 Compass.
18 Earth Thermometers.
1 Optical Bench and Accessories.
1 Besson Nephoscope.
4 Reading Telescopes and Stands.
3 Callendar Recording Electrical Thermometers.
3 Wild's Wind Vanes.

# APPENDIX VI.

## REPORT ON THE INSPECTION OF STATIONS IN CONNEXION WITH THE OFFICE IN 1910.

The inspectors were as follows :—

| | |
|---|---|
| Districts 0, 1 and 6 | Mr. A. Watt, Mr. R. G. K. Lempfert, Mr. T. W. Baker, Mr. W. H. Dines. |
| District 2 | Mr. A. Watt, Mr. E. Gold. |
| ,, 3 | Mr. E. Gold. |
| ,, 4 | Mr. R. G. K. Lempfert. |
| ,, 5 | Mr. R. G. K. Lempfert, Mr. R. Corless, Mr. H. Harries. |
| ,, 7 | Mr. R. Corless. |
| ,, 8 | Mr. R. H. Curtis, Mr. H. Harries. |
| ,, 9 | Mr. F. J. Brodie. |
| ,, 10 | Mr. E. G. Constable. |
| Observatories and Anemograph Stations. | Mr. R. H. Curtis, Mr. R. Corless, Mr. T. W. Baker, and Mr. E. G. Constable. |

By arrangement with the Scottish Meteorological Society, Mr. A. Watt was appointed as additional inspector for the year ending 31st March, 1911. Mr. W. H. Dines undertook the inspection of a number of stations in Scotland.

At the observatories and anemograph stations the instruments were dismounted and cleaned, and all necessary repairs were carried out. At those observatories which are also climatological or telegraphic reporting stations the arrangements for this work were examined.

The reports show that efficiency has been maintained on the whole; in a number of cases the inspectors were able to make suggestions for improving the observations by bringing them more into line with recognized conventions. Points requiring attention which could not be settled on the spot have been dealt with by correspondence.

The following is a list of the stations visited :—

### OBSERVATORIES.

Aberdeen.
Armagh.
Falmouth.
Glasgow.
Oxford.
Stonyhurst.
Valencia.

### ADDITIONAL ANEMOGRAPH STATIONS.

Alnwick Castle.
Deerness.
Dover.
Dublin (Phœnix Park).
Fleetwood.
Gorleston.
Holyhead.
Kingstown.
Llaneugrad.
North Shields.
Pendennis Castle (Falmouth).
Plymouth.
Roche's Point.
Scilly.
Yarmouth.

### Normal Climatological Stations.

Birmingham.
Cally.
Cambridge.
Crieff.
Deerness.
Douglas.
Dublin (Phœnix Park).
Fort William.
Glencarron.
Limerick.
Llaneugrad.
Marchmont.
Plymouth.
Poltalloch.
Reading.
Rothesay.
Ruthwell.
Salisbury (Wilton).
Scarborough.
Seaham.
Sheepstor.
Tottenham.
Whitby.
York.

### Auxiliary Climatological Stations.

Aberdovey.
Aberystwyth.
Arlington Court.
Ballinacurra.
Balruddery.
Baltasound.
Basingstoke.
Birmingham (Sparkhill).
Bognor.
Cardiff.
Colwyn Bay.
Coventry.
Cromer.
Deal.
Felixstowe.
Fortrose.
Fowey.
Fulbeck.
Maidenhead.
Matfield.
Newcastle-on-Tyne.
Newquay.
Oban.
Paignton.
Penzance.
Portsmouth.
St. Asaph.
Skegness.
Southend.
Swansea.
Totland Bay.
Towyn.
Winslow.
Wokingham.

### Telegraphic Reporting Stations.

Aberdeen.
Barra Island.
Clacton-on-Sea.
Blacksod Point.
Donaghadee.
Dover.
Dungeness.
Holyhead.
Jersey.
Leith.
Liverpool.
Malin Head.
Nairn.
North Shields.
Oxford.
Portland Bill.
Roche's Point.
Scilly.
Spurn Head.
Stornoway.
Valencia.
Wick.

### Miscellaneous Stations.

Cambridge (Newnham College, Hygrograph).
Lock Awe (Rainfall).
Mallaranny ,,

Mr. W. Marriott visited the following stations which are in connexion with the Royal Meteorological Society, as well as with the Office :—

Bath, Cahir, Cullompton, Dublin (City and Trinity College), Haverfordwest, Hereford, Llandudno, Newcastle (Wicklow), Newquay, Penzance, Salcombe, Shaftesbury, Sheepstor, Teignmouth, Torquay, Whitchurch, Woolacombe.

# APPENDIX VII.

## GEOGRAPHICAL LIST OF INSTITUTIONS AND PERSONS FROM WHOM PUBLICATIONS CONTAINING Meteorological Data HAVE BEEN RECEIVED DURING THE LAST EIGHT YEARS.

The list is arranged in accordance with the revised topographical classification adopted in the International Catalogue of Scientific Literature. *In each section the names of institutions which collect observations from a network of stations, or which publish observations on an extended scale, have been placed first.* In a number of instances, particularly in the case of tropical countries, observations are published by authorities not domiciled in the country. In these instances the names of the places of observation have been given as far as space permits, and the names of the institutions issuing the publications have been printed in *italic* type. If no names of places are quoted, it may be assumed that returns from a number of stations are given.

The character of the information available has been indicated by quoting the numbers in the International Catalogue under which the publications have been classified.

The year quoted is the last complete year for which the information has been received.

The classification numbers employed are as follows :—

1710 and 1730. Climatology—Agricultural and Hygienic.
1180. Rainfall Tables.
1800. Meteorological Observations—General.
1810. Hourly Values.
1820. Daily Values.
1825. Monthly and Yearly Mean Values.
1830. Daily Weather Reports.
1840. Weather Reports—Weekly, Monthly, &c.

† Indicates publications which give information for the upper air, obtained with balloons or kites.

## Geographical List of Institutions and Persons supplying published Meteorological Data.

| Name of Institution, &c. | Climatology—Agricultura and Hygienic. 1710 & 1730 | Rainfall Tables. 1180. | Meteorological Observations—General. 1800. | Hourly Values. 1810. | Daily Values. 1820. | Monthly and Yearly Mean Values. 1825. | Daily Weather Reports and Charts. 1830. | Weekly or Monthly Weather Reports. 1840. |
|---|---|---|---|---|---|---|---|---|
| **GENERAL.** | | | | | | | | |
| International Committee for Scientific Aeronautics, Strassburg. | — | — | 1907 | — | — | — | — | — |
| Board of Trade, London—Commercial, Labour, and Statistical Department. | — | — | — | — | — | 1907 | — | — |
| Symons's Meteorological Magazine .. | — | — | — | — | — | 1910 | — | — |
| *d.* **EUROPE AND MEDITERRANEAN SEA AND ISLANDS.** | | | | | | | | |
| Deutsche Seewarte, Hamburg .. .. | — | — | — | — | — | — | — | 1910 |
| *da.* **Scandinavia: Sweden, Norway, Denmark, Iceland, Faeroes:—** | | | | | | | | |
| Dansk Meteorologisk Institut (Copenhagen). | — | — | 1907 | — | 1910 | 1907 | 1910 | 1910 |
| Norsk Meteorologisk Institut (Christiania). | — | 1909 | 1909 | 1909 | 1909 | 1909 | — | — |
| Svensk Meteorologisk Institut (Stockholm). | — | — | — | — | — | — | — | 1910 |
| K. Svenska Vetenskaps-Akademie (Stockholm). | — | — | — | — | 1909 | 1909 | — | — |
| Stockholm (H. E. Hamberg) .. | — | — | — | — | — | | — | — |
| Upsala, Observatoire Météorologique de l'Université. | — | — | 1910 | 1910 | 1910 | — | — | — |
| Vassijaure, *K. Svenska Ventensks. Akademie, Stockholm.* | — | — | — | 1907 | — | — | — | — |
| *db.* **Russia in Europe:—** | | | | | | | | |
| Observatoire Physique Central Nicolas (St. Petersburg). | — | — | 1906 | 1906 | 1906 | 1906 | 1910† | 1909 |
| Finland, Meteorologische Zentralanstalt (Helsingfors). | — | — | 1903 | 1903 | 1903 | 1903 | — | 1907 |
| Kaiserliche Livländische Gemeinnützige u. Ökonomische Sozietät. Dorpat (Jurjef). | — | 1905 | — | — | — | — | — | — |
| Dorpat, Meteorologisches Observatorium. | — | — | 1909 | 1909 | 1909 | — | — | — |
| Dorpat, Station Météorologique de l'Ecole Reale. | — | — | — | — | 1906 | — | — | — |
| Kazan, Observatoire Météorologique. | — | — | — | — | 1902 | — | — | — |
| Kieff, Observatoire Météorologique. | — | — | — | 1907 | 1907 | — | — | — |
| Moscow (E. Leyst) .. .. .. | — | — | 1907 | — | — | — | — | — |
| Moscow, Meteorologisches Observatorium der K. Universität | — | — | — | 1907 | 1907 | — | — | — |
| Nijni-Oltchedaeff, Observatoire Météorologique. | — | — | 1910 | 1910 | 1910 | 1909 | — | — |
| Odessa, Observatoire Météorologique et Magnétique de l'Université Impériale. | — | 1905 | 1905 | — | 1909† | 1906 | — | — |
| St. Petersburg, Observatoire Météorologique de l'Institut Forestier Impériale. | — | — | — | — | 1909 | — | — | — |
| Tiflis, Physical Observatory .. | — | — | 1904 | 1904 | — | — | — | 1909 |
| Warsaw, Station Centrale Météorologique du Musée de l'Industrie et de l'Agriculture. | — | — | 1903 | — | 1903 | 1903 | — | — |

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[*] Means of temperature in Stockholm for 1756 to 1905 and in Sweden for 1856 to 1907.

## GEOGRAPHICAL LIST—*continued.*

| NAME OF INSTITUTION, &C. | Climatology—Agricultural and Hygienic. 1710 & 1730. | Rainfall Tables. 1180. | Meteorological Observations —General. 1800. | Hourly Values. 1810. | Daily Values. 1820. | Monthly and Yearly Mean Values. 1825. | Daily Weather Reports and Charts. 1830. | Weekly or Monthly Weather Reports. 1840. |
|---|---|---|---|---|---|---|---|---|
| *d.* **EUROPE AND MEDITERRANEAN ISLANDS**—*cont.* | | | | | | | | |
| *dc.* **German Empire:—** | | | | | | | | |
| Deutsche Seewarte (Hamburg) | — | — | 1909 | 1909 | 1909 | 1909 | 1910† | 1910 |
| Prussia, K. Meteorologisches Institut (Berlin). | — | 1908 | 1905 | 1905 | 1905 | 1910 | — | 1910 |
| Alsace-Lorraine, Meteorologischer Landesdienst (Strassburg). | — | — | 1904 | 1904 | 1904 | 1909 | — | — |
| Baden, Central Bureau für Meteorologie und Hydrographie (Carlsruhe). | — | 1910 | 1909 | — | 1909 | 1909 | — | 1910 |
| Bavaria, K. Meteorologische Central Station (Munich). | — | — | 1909† | 1909 | 1909 | 1909 | 1910 | — |
| Hessen, G. Hydrographisches Bureau (Darmstadt). | — | 1910 | 1909 | 1909 | 1909 | — | — | 1910 |
| Saxony, K. Sächs. Landes-Wetterwarte (Dresden). | — | — | 1907 | 1907 | 1907 | 1907 | 1910 | 1909 |
| Württemberg, K. Statistisches Landesamt und Meteorologische Central Station (Stuttgart). | — | — | 1910† | 1900 | 1909 | 1909 | — | 1910 |
| Aachen, Meteorologisches Observatorium. | — | — | 1908 | 1908 | 1908 | 1903 | 1910 | — |
| Berlin, Wetter Bureau .. .. | — | — | — | — | — | — | 1910 | — |
| Bremen, Meteorologische Station | — | — | 1909 | 1909 | 1909 | — | — | — |
| Eberswalde, Meteorologische Station. | — | — | — | — | — | — | — | 1903 |
| Emden, Naturforschende Gesellschaft. | — | — | — | — | — | 1907 | — | — |
| Frankfurt am Main, Physikalischer Verein. | — | — | — | — | 1908 | — | — | — |
| Lindenberg, K. Preussisches. Aeronautisches Observatorium. | — | — | 1908† | — | — | — | — | — |
| Potsdam, K. Preuss. Met. Institut | — | — | 1909 | 1909 | 1909 | — | — | — |
| *dd.* **Holland; Belgium; Luxemburg:—** | | | | | | | | |
| K. Nederlandsch Meteorologisch Institut (de Bilt). | — | 1908 | 1908 | 1908 | 1908 | 1908 | 1910 | 1910 |
| Observatoire Royal, Uccle, Brussels. | — | — | 1904 | 1904 | 1904 | 1904 | 1910 | — |
| Mons (A. Bracke) .. .. .. | — | — | — | — | 1905 | — | — | — |
| *de.* **British Islands:—** | | | | | | | | |
| Meteorological Office (London) | — | — | — | 1910 | 1910 | 1909 | 1910 | 1910† |
| British Rainfall (H. R. Mill) .. | — | 1909 | — | — | — | — | — | — |
| R. Meteorological Society (London). | — | — | 1909 | — | 1909 | 1909 | — | — |
| Scottish Meteorological Society (Edinburgh). | — | 1907 | 1907 | — | — | 1907 | — | — |
| Board of Agriculture and Fisheries, London. | 1908 | — | — | — | — | — | — | — |
| General Register Office, Dublin | 1910 | — | — | — | 1910 | 1910 | — | 1910 |
| General Register Office, London | 1910 | — | — | — | 1910 | 1910 | — | 1910 |
| Registrar General's Office, Edinburgh. | 1910 | — | — | — | — | 1910 | — | 1910 |
| Royal Observatory, Greenwich | — | — | 1908 | 1908 | 1908 | — | — | — |
| Royal Society of Edinburgh [Fort William and Ben Nevis]. | — | — | — | 1897 | — | — | — | — |
| Bath, Medical Officer of Health | 1910 | — | — | — | — | — | — | — |
| Blackpool, Public Health Office | 1909 | — | — | — | — | 1908 | — | — |
| Bognor, Medical Officer of Health | 1909 | — | — | — | — | 1908 | — | — |
| Bolton, The Museums and Meteorological Observatory. | — | — | — | — | — | 1907 | — | 1910 |

## GEOGRAPHICAL LIST—*continued.*

| NAME OF INSTITUTION, &C. | Climatology—Agricultural and Hygienic. 1710 & 1730. | Rainfall Tables. 1180. | Meteorological Observations—General. 1800. | Hourly Values. 1810. | Daily Values. 1820. | Monthly and Yearly Mean Values. 1825. | Daily Weather Reports and Charts. 1830. | Weekly or Monthly Weather Reports. 1840. |
|---|---|---|---|---|---|---|---|---|
| *d.* **EUROPE AND MEDITERRANEAN ISLANDS**—*cont.* | | | | | | | | |
| *de.* **British Islands**—*cont.* | | | | | | | | |
| Borden Wood, Sussex (E. Lamb) | — | — | — | — | — | 1910 | — | — |
| Bournemouth (C. Dales) .. .. | — | — | — | — | — | 1907 | — | — |
| Brighton, Medical Officer of Health. | 1902 | — | — | — | — | — | — | — |
| Burnley, Medical Officer of Health. | 1909 | — | 1909 | — | — | — | — | — |
| Buxton, Devonshire Hospital .. | — | — | — | — | — | 1909 | — | — |
| Canterbury (A. Lander) .. .. | — | — | — | — | — | 1909 | — | — |
| Cardiff, Naturalists' Society .. | — | 1907 | — | — | — | 1907 | — | — |
| Cardiff, Waterworks Engineer's Office. | — | 1905 | — | — | — | — | — | — |
| Chester (J. C. Mitchell) .. .. | — | — | — | — | — | 1905 | — | — |
| Clongowes Wood College .. | — | — | — | — | — | 1909 | — | — |
| Cockle Park, Morpeth .. .. | — | — | — | — | — | 1904 | — | — |
| Coventry, Medical Officer of Health. | 1909 | — | — | — | — | 1909 | — | — |
| Croydon, Natural History and Scientific Society. | — | 1909 | — | — | 1909 | — | — | — |
| Devon, North (T. Wainwright).. | — | — | — | — | — | 1906 | — | — |
| Dorset (*late* H. S. Eaton) .. .. | — | 1903 | — | — | — | — | — | — |
| Eastbourne, Borough Meteorologist. | — | — | — | — | — | 1909 | — | — |
| East Ham, Public Health Department. | 1907 | — | — | — | — | 1909 | — | — |
| Falmouth, R. Cornwall Polytechnic Society. | — | — | — | — | — | 1909 | — | — |
| Great Central Railway .. .. | — | 1910 | — | — | — | — | — | — |
| Harrogate, Harlow Moor Observatory. | — | — | — | — | — | 1907 | — | — |
| Hastings, Borough Meteorologist. | — | — | — | — | — | 1909 | — | — |
| Hertfordshire (J. Hopkinson) .. | — | 1906 | — | — | — | 1906 | — | — |
| Hoylake and West Kirby, Urban District Council. | — | — | — | — | — | 1910 | — | — |
| Isle of Man (*late* A. W. Moore) .. | — | — | — | — | — | 1904 | — | — |
| Kew National Physical Laboratory. | — | — | — | — | — | 1909 | — | — |
| Kingston-on-Thames, Surrey County Council. | 1908 | — | — | — | — | 1908 | — | — |
| Liverpool Observatory, Bidston. | — | — | — | — | 1908 | — | — | — |
| London, Royal Botanic Society | — | — | — | — | 1909 | — | — | — |
| Lowestoft, Medical Officer of Health. | 1909 | — | — | — | — | 1909 | — | — |
| Manchester, Godlee Observatory | — | — | — | — | 1909 | — | — | — |
| Manchester, Public Health Office | 1904 | — | — | — | 1904 | — | — | — |
| Margate, Borough Meteorologist | — | — | — | — | — | 1909 | — | — |
| [Netley.] *Army Medical Department, London.* | — | — | — | — | — | 1906 | — | — |
| Northampton, Natural History Society. | — | 1909 | — | — | — | — | — | 1909 |
| Norwich (A. W. Preston) .. | — | — | — | — | — | 1909 | — | — |
| Nottingham (A. Brown and P. Boobbyer). | — | 1910 | 1910 | — | — | — | — | — |
| Nottingham, Rural District Council of Basford. | 1903 | — | — | — | — | 1903 | — | — |
| Paisley, Coats Observatory .. | — | — | — | — | — | 1905 | — | — |
| Perth, Natural History Museum | — | — | — | — | — | 1908 | — | — |
| Portsmouth, Medical Officer of Health. | 1909 | — | 1909 | — | — | — | — | — |
| Rousdon Observatory .. .. | — | — | — | — | — | 1903 | — | — |
| Rugby School Natural History Society. | — | — | — | — | — | 1909 | — | — |
| Scarborough, Medical Officer of Health. | 1909 | — | — | — | — | 1909 | — | — |
| Seaham Harbour, Medical Officer of Health. | 1907 | — | — | — | — | 1907 | — | — |
| Sevenoaks (W. W. Wagstaffe) .. | — | — | — | — | — | 1905 | — | — |
| Shropshire (W. M. De La Touche) | — | 1907 | — | — | — | — | — | — |
| Southampton, Medical Officer of Health | 1906 | — | — | — | — | 1906 | — | — |

## GEOGRAPHICAL LIST—*continued.*

| NAME OF INSTITUTION, &C. | Climatology—Agricultural and Hygienic. 1710 & 1730. | Rainfall Tables. 1180. | Meteorological Observations —General. 1800. | Hourly Values. 1810. | Daily Values. 1820. | Monthly and Yearly Mean Values. 1825. | Daily Weather Reports and Charts. 1830. | Weekly or Monthly Weather Reports. 1840. |
|---|---|---|---|---|---|---|---|---|
| *d.* **EUROPE AND MEDITERRANEAN ISLANDS**—*cont.* | | | | | | | | |
| *de.* **British Islands**—*cont.* | | | | | | | | |
| Southport, Fernley Observatory | — | — | 1909 | 1909 | 1910 | 1909 | — | — |
| Stonyhurst College Observatory | — | — | — | — | — | 1910 | — | — |
| Teignmouth, Urban District Council. | — | 1909 | — | — | — | 1910 | — | — |
| Throcking (C. W. Harvey) .. | — | 1909 | — | — | — | 1909 | — | — |
| Totland Bay, Isle of Wight (J Dover). | — | — | — | — | — | 1910 | — | — |
| Truro, Cornwall County Council, Sanitary Committee. | 1910 | — | — | — | — | 1909 | — | 1910 |
| Truro (G. Penrose) .. .. .. | — | — | — | — | — | 1900 | — | — |
| Waterford (C. E. Perceval Bolton) | — | — | — | — | — | — | — | 1910 |
| Weymouth and Melcombe Regis | — | — | — | — | — | 1909 | — | — |
| Whitchurch (E. E. Glyde) .. | — | — | 1910 | — | — | — | — | — |
| Worksop (H. Mellish) .. .. | — | — | — | — | — | 1910 | — | — |
| York, Yorkshire Philosophical Society. | — | — | — | — | — | 1909 | — | — |
| *df.* **France and Corsica:—** | | | | | | | | |
| Bureau Central Météorologique de France (*Paris*). | — | 1906 | 1907 | 1907 | 1907 | 1907 | 1910 | 1910 |
| Avignon, Commission Météorologique du Département de Vaucluse. | — | — | 1903 | — | — | 1903 | — | — |
| Beaulieu, Sèvres et Vacquey (G. Eiffel). | — | — | 1909 | — | 1905 | 1909 | — | — |
| Bordeaux, Commission Météorologique de la Gironde. | — | 1909 | — | — | 1909 | — | — | — |
| Chevreuse, Observatoire .. .. | — | — | — | — | 1907 | — | — | — |
| Lyons, Commission Départementale de Météorologie du Rhône. | — | 1908 | 1908 | — | — | — | — | — |
| Marseilles, Commission de Météorologie du Département des Bouches-du-Rhone. | — | — | 1909 | — | 1909 | — | — | — |
| Paris, Observatoire Municipal (Observatoire de Montsouris). | — | — | — | — | 1907 | — | — | — |
| Paris, Service Hydrométrique du Bassin de la Seine. | — | 1908 | — | — | — | — | — | — |
| Perpignan, Commission Météorologique. | — | — | 1908 | — | 1908 | 1908 | — | — |
| Puy-de-Dôme, Observatoire .. | — | — | — | — | 1905 | — | — | — |
| *dg.* **Iberian Peninsula (including Pyrenees): Spain (with Balearic Islands); Portugal:—** | | | | | | | | |
| Instituto Central Meteorológico (Madrid). | — | — | — | — | — | 1908 | 1910 | — |
| Observatorio Do Infante D. Luiz (Lisbon). | — | — | — | — | 1907 | 1907 | 1910 | — |
| Observatorio, Madrid .. .. | — | — | — | — | 1909 | 1900 | — | — |
| Coimbra, Observatorio Meteorologico e Magnetico da Universidade. | — | — | 1909 | 1909 | 1909 | - | — | — |
| Gibraltar. *Army Medical Dep., London.* | — | — | — | — | — | 1906 | — | — |
| Granada, Observatorio Meteorológico de Cartuja. | — | — | 1908 | 1908 | 1910 | — | — | — |
| Llinas, Observatorio Belloch .. | — | — | 1904 | — | — | — | — | — |
| Madrid, Chamartin de la Rosa, Observatorio Meteorológico. | — | — | — | — | 1906 | — | — | — |
| Mahon (Minorca). *Bureau Central Mét., Paris.* | — | — | — | — | — | 1907 | — | — |
| Oña, Observatorio .. .. .. | — | — | — | — | 1910 | — | — | — |
| Oporto, Observatorio Meteorologico da Princeza D. Amelia. | — | — | — | — | — | 1910 | — | — |
| San Fernando, Instituto y Observatorio de Marina. | — | — | 1909 | 1909 | 1909 | — | — | — |

## GEOGRAPHICAL LIST—*continued.*

| NAME OF INSTITUTION, &C. | Climatology—Agricultural and Hygienic. 1710 & 1730. | Rainfall Tables. 1180. | Meteorological Observations—General. 1800. | Hourly Values. 1810. | Daily Values. 1820. | Monthly and Yearly Mean Values 1825. | Daily Weather Reports and Charts. 1830. | Weekly or Monthly Weather Reports. 1840. |
|---|---|---|---|---|---|---|---|---|
| *d.* **EUROPE AND MEDITERRANEAN ISLANDS**—*cont.* | | | | | | | | |
| *dh.* **Italy: Sicily and Sardinia:—** | | | | | | | | |
| Ufficio Centrale Meteorologico e Geodinamico Italiano (Rome). | 1910 | — | 1906 | — | — | 1906 | 1910 | — |
| Bologna, Osservatorio della R. Università. | — | — | — | — | 1909 | — | — | — |
| Catania, R. Osservatorio .. .. | — | — | — | — | — | 1908 | — | — |
| Florence, R. Museo di Fisica e Storia Naturale. | — | — | — | — | 1909 | — | — | — |
| Florence, Osservatorio Ximeniano | — | — | — | — | — | 1907 | — | — |
| Messina, Osservatorio .. .. | — | — | — | — | 1907 | — | — | — |
| Milan, R. Osservatorio Astronomico di Brera. | — | — | — | — | 1909 | — | — | — |
| Modena, R. Osservatorio Geofisico. | — | — | — | — | 1908 | — | — | — |
| Moncalieri, Osservatorio del Real Collegio Carlo Alberto. | — | — | — | — | 1910 | — | — | — |
| Naples, R. Osservatorio di Capodimonte. | — | — | — | — | 1909 | 1908 | — | — |
| Riposto, Osservatorio Meteorologico del R. Instituto Nautico. | — | — | — | — | 1910 | — | — | — |
| Rome, Specola Vaticana .. .. | — | — | — | — | 1905 | — | — | — |
| Turin, Osservatorio della R. Università. | — | — | — | — | 1909 | — | — | — |
| Venice, Osservatorio Meteorologico del Seminario Patriarcale. | — | — | — | — | 1906 | — | — | — |
| Venice, Ufficio Idrografico .. | — | — | — | 1910 | 1910 | — | — | — |
| *dl* **Switzerland:—** | | | | | | | | |
| Schweizerische Meteorologische Central Anstalt (Zürich). | — | 1907 | 1909† | 1909 | 1909 | 1909 | 1910 | — |
| Berne, Abteilung für Landeshydrographie. | — | 1908 | 1908 | 1904 | 1908 | — | — | — |
| Davos Traffic Association .. | — | — | — | — | 1910 | — | — | 1909 |
| Genève et le Grand St. Bernard (R. Gautier). | — | — | — | — | 1908 | — | — | — |
| Lausanne, Institut Agricole .. | — | — | — | — | 1908 | — | — | — |
| St. Moritz (R. Gautier et H. Duaime). | — | — | — | — | 1908 | — | — | — |
| *dk.* **Austria-Hungary, with Bosnia and Herzegovina:—** | | | | | | | | |
| K. K. Central Anstalt für Meteorologie und Erdmagnetismus (Vienna). | — | — | 1907 | 1907 | 1910† | 1907 | 1910 | — |
| K. K. Hydrographischer Dienst in Osterreich (Vienna). | — | 1907 | — | — | 1907 | — | — | 1910 |
| Hydrographisches Amt der K. K. Kriegs-Marine (Pola). | — | — | 1909 | 1909 | 1909 | 1906 | — | — |
| K. Ung. Reichs-Anstalt für Meteor. und Erdmagn. (Budapest). | — | 1906 | 1906 | 1906 | 1910 | 1906 | 1910 | — |
| Bosnisch-Hercegovinische Landesregierung (Sarajevo). | — | — | 1908 | 1908 | 1908 | 1908 | — | — |
| Agram, Meteorologisches Observatorium. | — | 1906 | 1906 | 1906 | 1906 | — | — | — |
| Brünn, Meteorologische Commission des naturforschenden Vereines. | — | — | 1906 | — | — | 1906 | — | |

## GEOGRAPHICAL LIST—*continued.*

| NAME OF INSTITUTION, &C. | Climatology—Agricultural and Hygienic. 1710 & 1730. | Rainfall Tables. 1180. | Meteorological Observations —General. 1800. | Hourly Values. 1810. | Daily Values. 1820. | Monthly and Yearly Mean Values. 1825. | Daily Weather Reports and Charts. 1830. | Weekly or Monthly Weather Reports. 1840. |
|---|---|---|---|---|---|---|---|---|
| *d.* **EUROPE AND MEDITERRANEAN ISLANDS**—*cont.* | | | | | | | | |
| *dk.* **Austria-Hungary, with Bosnia and Herzegovina**—*cont.* | | | | | | | | |
| Cracow, C. K. Akademii Umiejętnosci u. Krakowie. | — | — | — | — | 1902 | — | — | — |
| Cracow, K. K. Sternwarte .. | — | — | — | — | 1910 | — | — | — |
| Cracow, Obserwatoryum .. | — | — | — | — | — | 1909 | — | — |
| Fiume, K. K. Marine-Akademie | — | — | — | — | 1906 | — | — | — |
| Innsbruck, Meteorologisches Observatorium. | — | — | 1909 | 1909 | 1909 | — | — | — |
| Klagenfurt (F. Jäger) .. .. | — | — | — | — | 1907 | 1907 | — | — |
| Kremsmünster, Sternwarte .. | — | — | 1906 | 1906 | — | — | — | — |
| Prague, K K. Sternwarte .. | — | — | — | — | 1909 | — | — | — |
| Trieste, [I.R.] Osservatorio Astronomico-Meteorologico. | — | — | 1906 | 1906 | 1906 | 1906 | — | — |
| Trieste, I.R. Osservatorio Marittimo. | — | — | — | — | — | — | 1910 | — |
| Vienna, K. K Sternwarte .. | — | — | — | — | 1903 | — | — | — |
| *dl.* **Balkan Peninsula :—** | | | | | | | | |
| Observatorul Astronomic si Meteorologic (Bucharest). | 1909 | 1909 | 1902 | 1902 | 1902 | 1902 | 1910 | 1909 |
| Observatoire National (Athens) | — | — | — | — | — | 1908 | — | — |
| Belgrade, Observatoire Central | — | — | — | 1903 | — | — | — | 1903 |
| Monastir and Cavalla. *Bureau Central Mét., Paris.* | — | 1905 | — | — | — | 1907 | — | — |
| Roumania (S.C. Hepites) .. .. | — | 1903 | — | — | — | — | — | — |
| Salonika, Gymnase Bulgare .. | — | — | — | — | — | 1908 | — | — |
| Salonika and Scutari. *K. K. Central-Anstalt für Meteorologie, Vienna.* | — | — | — | — | — | 1907 | — | — |
| Salonika. *Observatoire Physique Central Nicolas, St. Petersburg.* | — | — | — | — | — | 1906 | — | — |
| Sofia, Institut Météorologique Central. | — | — | 1908 | 1908 | 1908 | 1908 | — | — |
| Sofia, Station Centrale Météorologique de Bulgarie. | — | 1910 | — | — | — | — | — | 1910 |
| Thera. (F. Frhv. Hiller von Gaertringen.) | — | — | 1902 | 1902 | 1902 | 1902 | — | — |
| *dm.* **Mediterranean and Islands :—** | | | | | | | | |
| Cyprus Public Works Department (Nicosia). | — | 1910 | — | — | — | 1909 | — | — |
| Malta and Cyprus. *Army Medical Dep., London.* | — | — | — | — | — | 1906 | — | — |
| Malta. *Bureau Central Mét., Paris* | — | — | — | — | — | 1902 | — | — |
| *dq.* **English Channel, including Channel Islands :—** | | | | | | | | |
| Guernsey (A. Collenette).. .. | — | 1909 | — | — | — | 1909 | — | — |
| Jersey, Observatoire St. Louis .. | — | — | 1910 | 1910 | 1910 | — | — | — |
| *e.* **ASIA AND MALAY ARCHIPELAGO.** | | | | | | | | |
| *ea.* **Asiatic Russia :—** | | | | | | | | |
| *Observatoire Physique Central Nicolas (St. Petersburg).* | — | — | 1906 | 1905 | 1906 | 1906 | — | — |

## GEOGRAPHICAL LIST—*continued.*

| NAME OF INSTITUTION, &C. | Climatology—Agricultural and Hygienic. 1710 & 1730. | Rainfall Tables. 1180. | Meteorological Observations —General. 1800. | Hourly Values. 1810. | Daily Values. 1820. | Monthly and Yearly Mean Values. 1825. | Daily Weather Reports and Charts. 1830. | Weekly or Monthly Weather Reports. 1840. |
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| *e.* **ASIA AND MALAY ARCHIPELAGO**—*cont.* | | | | | | | | |
| *eaa.* **West Siberia :—** | | | | | | | | |
| Tobolsk, Tomsk. *Observatoire Physique Central Nicolas, St. Petersburg.* | — | — | — | — | 1906 | 1906 | — | — |
| *eab.* **East Siberia :—** | | | | | | | | |
| Irkutsk, Observatoire Magnétique et Météorologique. | — | — | 1905 | 1905 | 1905 | 1905 | — | — |
| *Observatoire Physique Central Nicolas, St. Petersburg.* | — | — | — | — | 1906 | 1906 | — | — |
| *eac.* **Central Asiatic Russia :—** | | | | | | | | |
| *Observatoire Physique Central Nicolas, St. Petersburg.* | — | — | — | — | 1906 | 1906 | — | — |
| *eb.* **China and Dependencies: Tibet, Corea :—** | | | | | | | | |
| Hong-Kong, Observatory .. | — | — | 1909 | 1909 | 1910 | 1910 | 1909 | — |
| Chimulpo, Meteorological Observatory. | — | — | 1909 | — | 1909 | — | — | — |
| Chimulpo, Peking, Urgar. *Observatoire Physique Central Nicolas, St. Petersburg.* | — | — | — | — | — | 1906 | — | — |
| *Deutsche Seewarte, Hamburg* .. | — | — | — | 1908 | 1901 | 1908 | — | — |
| Hong-Kong and Weihaiwei. *Army Medical Dep., London.* | — | — | — | — | — | 1906 | — | — |
| Kashgar, &c. *Meteorological Office, India (Simla).* | — | — | — | — | — | 1909 | — | — |
| Kharbin (Manchuria), *Observatoire Physique Central Nicolas, St. Petersburg.* | — | — | 1906 | 1906 | 1906 | 1906 | — | — |
| Ou-tschang. *K. K. Central-Anstalt für Meteorologie, Vienna.* | — | — | — | — | — | 1906 | — | — |
| Peking, Inspectorate General of Customs. | 1904 | — | — | — | — | — | — | — |
| *Tokio, Central Meteorological Observatory.* | — | — | — | — | 1906 | — | — | — |
| Tchang-Sin-Tien, Tien-Tsin, Yunnan-Sen, &c. *Bureau Central Mét., Paris.* | — | 1907 | — | — | — | 1907 | — | — |
| Weihawei, Medical Officer .. | — | — | — | — | — | 1906 | — | — |
| Zikawei, Observatoire Magnétique et Météorologique. | — | — | 1907 | 1907 | 1907 | 1907 | 1910 | — |
| *ec.* **Japanese Islands, Formosa :—** | | | | | | | | |
| Central Meteorological Observatory (Tokio). | — | — | 1909 | 1909 | 1909 | 1909 | 1910 | — |
| Mizusawa, International Latitude Observatory. | — | — | 1909 | — | 1909 | 1909 | — | — |
| Tsukubasan, Observatorium .. | — | — | 1907 | 1907 | 1907 | — | — | — |
| *ed.* **French Indo-China : Tonquin, Annam, &c. :—** | | | | | | | | |
| *Bureau Central Mét., Paris* .. | — | 1907 | 1907 | — | 1907 | 1907 | — | — |
| *ee.* **Siam:—** | | | | | | | | |
| Battambang, Pnom-Penh, Vien-Tiane (Laos), &c. *Bureau Central Mét., Paris.* | — | — | — | — | — | 1907 | — | — |

## Geographical List—*continued.*

| Name of Institution, &c. | Climatology—Agricultural and Hygienic. 1710 & 1730. | Rainfall Tables. 1180. | Meteorological Observations—General. 1800. | Hourly Values. 1810. | Daily Values. 1820. | Monthly and Yearly Mean Values. 1825. | Daily Weather Reports and Charts. 1830. | Weekly or Monthly Weather Reports. 1840. |
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| *c.* **ASIA AND MALAY ARCHIPELAGO**—*cont.* | | | | | | | | |
| *ef.* **British India: Himalaya, Burmah, Ceylon:—** | | | | | | | | |
| Meteorological Office, India, (Simla). | — | 1909 | 1910 | — | 1910 | 1910 | 1910 | 1909 |
| Agricultural Department, Calcutta. | — | 1909 | — | — | — | — | — | — |
| Meteorological Office, Bengal, Calcutta. | — | 1907 | 1909 | — | — | 1909 | 1910 | 1909 |
| Observatory, Colombo .. .. | — | — | 1909 | — | — | 1910 | — | — |
| Allahabad, Meteorological Office | — | 1909 | — | — | — | 1909 | — | — |
| Bangalore, Mysore Government Meteorological Department. | — | 1909 | 1908 | — | 1908 | 1908 | — | — |
| Bombay, Government Observatory. | — | — | 1905 | — | 1905 | — | — | — |
| Ceylon, Royal Botanic Gardens | — | 1903 | — | — | — | — | — | — |
| Kodaikánal, Observatory .. | — | — | — | — | — | 1908 | — | — |
| Meteorological Reporter to Government, Punjab. | — | — | — | — | — | 1910 | — | 1910 |
| Karikal, Pondichery, Yanaon (Madras Pres.), &c. *Bureau Central Mét., Paris.* | — | — | — | — | — | 1907 | — | — |
| *eg.* **Malay Peninsula and Archipelago, Philippines, &c.:—** | | | | | | | | |
| Royal Magnetical and Meteorological Observatory (Batavia). | — | 1908 | 1907 | 1907 | — | 1907 | — | — |
| Philippine Weather Bureau, Manila Central Observatory. | — | — | 1907 | 1907 | 1909 | — | — | 1909 |
| Principal Civil Medical Officer, Straits Settlements (Singapore). | — | 1904 | 1908 | — | 1908 | 1908 | — | — |
| British North Borneo (British N. Borneo Herald). | — | — | — | — | 1910 | — | — | — |
| Buitenzorg, Institut Botanique de l'Etat. | — | — | — | — | 1908 | — | — | — |
| Penang, Singapore. *Meteorological Office, India (Simla).* | — | — | — | — | — | 1909 | — | — |
| Singapore. *Army Medical Dep., London.* | — | — | — | — | — | 1906 | — | — |
| Negri Sembilan, Pahang, Perak, Selangor, Taiping | — | — | — | — | — | 1909 | — | — |
| *eh.* **Persia, Afghanistan, Baluchistan, Pamirs:—** | | | | | | | | |
| Bushire, Ispahan, Jask, Kabul, Quetta, &c. *Meteorological Office, India (Simla).* | — | — | — | — | — | 1909 | — | — |
| Bushire. *Bureau Central Mét., Paris.* | — | — | — | — | — | 1905 | — | — |
| Enzeli, Khousseinabad (Seistan). *Observatoire Physique Central Nicolas, St. Petersburg.* | — | — | — | — | — | 1906 | — | — |
| *ei* **Asiatic Turkey, Arabia, Syria:—** | | | | | | | | |
| Aden, Baghdad, Bahrein, Busrah, Muscat, Beyrout. *Meteorological Office, India (Simla).* | — | — | — | — | — | 1909 | — | — |
| Babylon. *Deutsche Seewarte, Hamburg.* | — | — | — | — | — | 1908 | — | — |
| Beyrout, Jerusalem, &c. *K. K. Central-Anstalt für Meteorologie, Vienna.* | — | — | 1907 | — | 1907 | 1907 | — | — |

## GEOGRAPHICAL LIST—*continued.*

| NAME OF INSTITUTION, &C. | Climatology—Agricultural and Hygienic. 1710 & 1730. | Rainfall Tables. 1180. | Meteorological Observations —General. 1800. | Hourly Values. 1810. | Daily Values. 1820. | Monthly and Yearly Mean Values. 1825. | Daily Weather Reports and Charts. 1830. | Weekly or Monthly Weather Reports 1840 |
|---|---|---|---|---|---|---|---|---|
| *e.* **ASIA AND MALAY ARCHIPELAGO**—*cont.* | | | | | | | | |
| *ei.* **Asiatic Turkey, Arabia, Syria** —*cont.* | | | | | | | | |
| Hebron. *Scottish Met. Soc., Edinburgh.* | — | — | — | — | — | 1907 | — | — |
| Le Krey (Syria), Smyrna, and other stations. *Bureau Central Mét., Paris.* | — | 1905 | — | — | 1907 | 1907 | — | — |
| Scutari. *Army Medical Dep., London.* | — | — | — | — | — | 1906 | — | — |
| Sinope, Bouiouk-Dere. *Observatoire Physique Central Nicolas, St. Petersburg.* | — | — | — | — | — | 1906 | — | — |
| *f.* **AFRICA AND MADAGASCAR.** | | | | | | | | |
| *fa.* **Mediterranean States: Morocco, Algiers, Tunis, Tripoli:—** | | | | | | | | |
| Service Météorologique du Gouvernement Général de l'Algérie. | — | — | — | — | — | — | 1910 | — |
| Algeria and Tunis, Benghazi (Tripoli), Tangier, Mogador. *Bureau Central Mét., Paris.* | — | — | 1907 | — | 1907 | 1907 | — | — |
| Casablanca, Mogador, Saffi. *Deutsche Seewarte, Hamburg* | — | — | — | — | — | 1908 | — | — |
| Tripoli. *Ufficio Centrale Met. e Geodinam. Ital., Rome.* | — | — | — | — | — | 1905 | — | — |
| *fb.* **North-east Africa: Egypt, Nile Valley to 5° N., Abyssinia:—** | | | | | | | | |
| Survey Department, Cairo .. | — | 1909 | 1908 | 1908 | 1908 | 1908 | 1910 | 1909 |
| Department of Public Health, Cairo. | 1910 | — | — | — | 1910 | — | — | 1910 |
| Egyptian Sudan. *Meteorological Office, London.* | — | — | — | — | — | 1902 | — | — |
| Adis-Abéba (Abyssinia). *Observatoire Physique Central Nicolas, St. Petersburg.* | — | — | — | — | 1907 | 1907 | — | — |
| Khartoum. *Army Medical Dep., London.* | — | — | — | — | — | 1904 | — | — |
| Ismailia, Port Said, Suez, Harar (Abyssinia). *Bureau Central Mét., Paris.* | — | — | — | — | 1906 | 1906 | — | — |
| *fc.* **Sahara and the Central Sudan:—** | | | | | | | | |
| Fort Lamy (Tchad), &c. *Bureau Central Mét., Paris.* | — | — | — | — | — | 1907 | — | — |
| *fd.* **West Africa, including French Sudan, from Morocco to the Congo:—** | | | | | | | | |
| Accra, Observatory .. .. | — | — | — | — | — | 1909 | — | — |
| Afrique Occidentale Française .. | — | — | — | — | — | 1905 | — | — |
| Gambia, Medical Officer .. .. | — | — | — | — | 1910 | — | — | — |
| Lagos, Survey Department .. | 1909 | — | — | — | — | 1910 | — | — |
| Sierra Leone Observatory .. | — | 1903 | — | — | — | — | — | — |
| Southern Nigeria Government Gazette. | 1909 | — | — | — | — | — | — | — |
| Zungeru (Northern Nigeria), Principal Medical Officer. | 1909 | — | 1909 | — | 1909 | 1909 | — | — |

## GEOGRAPHICAL LIST—*continued.*

| NAME OF INSTITUTION, &C. | Climatology—Agricultural and Hygienic. 1710 & 1730. | Rainfall Tables. 1180. | Meteorological Observations —General. 1800. | Hourly Values. 1810. | Daily Values. 1820. | Monthly and Yearly Mean Values. 1825. | Daily Weather Reports and Charts. 1830. | Weekly or Monthly Weather Reports. 1840. |
|---|---|---|---|---|---|---|---|---|
| ***f.* AFRICA AND MADAGASCAR—*cont.*** | | | | | | | | |
| ***fd.* West Africa, including French Sudan, from Morocco to the Congo—*cont.*** | | | | | | | | |
| Sierra Leone, Accra, Cape Coast, Kumasi. *Army Medical Dep., London.* | — | — | — | — | — | 1906 | — | — |
| Dahomey, French Guinea, French Sudan, Ivory Coast, Senegal. *Bureau Central Mét., Paris.* | — | — | — | — | 1907 | 1907 | — | — |
| Mamfe, Mundame (Cameroon). *Deutsche Seewarte, Hamburg.* | — | — | — | — | — | 1908 | — | — |
| ***fe.* Congo State and Angola:—** | | | | | | | | |
| Akka (*Meteorological Office, London*). | — | — | — | — | — | 1902 | — | — |
| Ka-Tanga, Mission Scientifique | — | — | 1899 | 1899 | — | — | — | — |
| Lambaréné, Libreville and other stations. *Bureau Central Mét., Paris.* | — | — | — | — | 1907 | 1907 | — | — |
| ***ff.* East Africa; British (with Uganda); German; Portuguese (north of the Zambesi); British Central Africa; Lake Region.** | | | | | | | | |
| British East Africa .. *Meteorological Office, London.* | — | — | — | — | — | 1902 | — | — |
| British Central Africa | — | — | — | — | — | 1902 | — | — |
| Rhodesia .. .. | — | — | — | — | — | 1902 | — | — |
| Uganda .. .. .. | — | — | — | — | — | 1902 | — | — |
| German East Africa. *Deutsche Seewarte, Hamburg.* | — | — | — | 1908 | 1908 | 1908 | — | — |
| Boroma and Zumba. *Haynald Observatorium, Kalocsa.* | — | — | 1897 | 1897 | 1897 | — | — | — |
| Mombasa. *Army Medical Dep., London.* | — | — | — | — | — | 1903 | — | — |
| British East Africa Agricultural Department (Nairobi). | — | — | — | — | — | 1909 | — | 1905 |
| Rhodesia. *Government Statist and Agricultural Department.* | — | — | — | — | — | 1908 | — | — |
| Uganda Protectorate, Scientific and Forestry Department (Entebbe). | — | — | — | — | 1905 | 1908 | — | — |
| Zanzibar. *Meteorological Office, India (Simla).* | — | — | — | — | — | 1909 | — | — |
| Zomba, Forestry and Botanical Department. | — | 1903 | — | — | 1910 | 1909 | — | — |
| ***fg.* South Africa—South of Angola and the Zambesi:—** | | | | | | | | |
| Meteorological Commission (Cape Town). | — | 1908 | 1908 | 1902 | — | 1908 | — | — |
| Transvaal Meteorological Department (Johannesburg). | — | 1910 | 1909 | 1909 | 1909 | — | 1910 | 1910 |
| Beira, Observatorio Meteorologico. | — | — | — | — | 1909 | — | — | — |
| Bulawayo (E. Goetz) .. .. | — | — | — | — | — | 1904 | — | — |
| Durban, Natal Observatory .. | — | 1902 | 1908 | — | 1908 | 1908 | — | — |
| Fort Napier (Natal), Pretoria. *Army Medical Dep., London.* | — | — | — | — | — | 1906 | — | — |
| German S.W. Africa (E. Ottweiler). | — | 1905 | — | — | — | — | — | — |
| Loanda, Observatorio .. .. | — | — | — | — | — | 1909 | — | — |
| Southern Rhodesia, &c. *Meteorological Office, London.* | — | — | — | — | — | 1902 | — | — |

## GEOGRAPHICAL LIST—*continued.*

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|---|---|---|---|---|---|---|---|---|
| *f.* **AFRICA AND MADAGASCAR**—*cont.* | | | | | | | | |
| *fh.* **Madagascar and Comoro Group:—** | | | | | | | | |
| Tananarive, Observatoire .. | — | — | 1908 | 1908 | 1908 | 1908 | — | — |
| *Bureau Central Mét., Paris* .. | — | 1907 | — | — | 1907 | 1907 | — | — |
| *fi.* **Red Sea and Islands:—** | | | | | | | | |
| *K. Akademie der Wissenschaften, Vienna.* | — | — | — | [1903] | [1903] | — | — | — |
| Perim. *Meteorological Office, India (Simla).* | — | — | — | — | — | 1909 | — | — |
| *g.* **NORTH AMERICA.** | | | | | | | | |
| *gb.* **Canada as a whole:—** | | | | | | | | |
| Meteorological Service, Dominion of Canada (Toronto). | — | — | — | — | — | — | 1909 | 1909 |
| Department of Marine and Fisheries (Ottawa). | — | — | 1906 | 1906 | 1906 | 1906 | — | — |
| Toronto Observatory .. .. | — | — | — | — | — | 1908 | — | — |
| *U.S. Weather Bureau, Washington* | — | — | — | — | — | 1908 | — | — |
| *gc.* **Canadian Dominion West.** | | | | | | | | |
| Alberta, Official Handbook .. | — | — | — | — | — | 1906 | — | — |
| Edmonton, Department of Agriculture. | — | — | — | — | — | 1909 | — | — |
| Regina, Department of Agriculture. | — | — | — | — | — | 1905 | — | — |
| *gd.* **Canadian Dominion East: Newfoundland, Labrador:—** | | | | | | | | |
| Toronto, Bureau of Industries .. | — | — | 1904 | — | — | — | — | — |
| Hebron, Nain, *Deutsche Seewarte, Hamburg.* | — | — | — | — | — | 1908 | — | — |
| St. Pierre and Miquelon, *Bureau Central Mét., Paris.* | — | 1905 | — | — | — | 1902 | — | — |
| St. Croix, Dansk Meteorologisk Institut, Copenhagen. | — | — | — | — | — | 1907 | — | — |
| *gf.* **United States as a whole:—** | | | | | | | | |
| U.S. Weather Bureau, Department of Agriculture, Washington. | — | — | 1908 | 1906 | 1908 | 1908 | 1910 | 1908 |
| *gg.* **North-Eastern United States, East of Mississippi:—** | | | | | | | | |
| Cambridge (Mass.), Astronomical Observatory of Harvard College. | — | — | — | — | 1905 | — | — | — |
| New York, Meteorological Observatory. | — | — | — | 1910 | — | — | — | — |
| Washington, United States Naval Observatory. | — | — | — | — | 1902 | — | — | — |
| *gi.* **Western United States, West of Mississippi:—** | | | | | | | | |
| Colorado Springs, Colorado College, observatory. | — | — | — | — | 1907 | 1907 | — | — |

## GEOGRAPHICAL LIST—*continued.*

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|---|---|---|---|---|---|---|---|---|
| *g.* **NORTH AMERICA**—*cont.* | | | | | | | | |
| *gl.* **Mexico:—** | | | | | | | | |
| Dirección General de Telégrafos Federales (Mexico). | — | — | — | — | — | — | 1904 | — |
| Observatorio Meteorológico Central (Mexico). | — | — | 1905 | 1905 | 1905 | — | — | 1905 |
| Guadalajara, Observatorio del Seminario Conciliar. | — | — | — | — | 1906 | — | — | — |
| Leon, Observatorio Meteorológico. | — | — | — | — | 1910 | — | — | 1910 |
| Morelia, Observatorio Meteorológico. | — | — | 1909 | — | 1909 | 1909 | — | — |
| Oaxaca (A. M. Dominguez) .. | — | 1903 | — | — | — | — | — | — |
| Oaxaca, Observatorio Meteorológico. | — | — | — | — | 1908 | — | — | 1908 |
| Puebla, Boletin de Estadistica .. | 1910 | — | — | — | 1910 | — | — | — |
| Saltillo, Observatorio Meteorológico del Colegio de San Juan Nepomucino. | — | — | — | — | 1905 | — | — | — |
| Tacubaya, Observatorio Astrónomico Nacional. | — | — | 1897 | — | 1897 | 1897 | — | — |
| *U.S. Weather Bureau, Washington.* | — | — | — | — | — | 1908 | — | — |
| Zacatecas, Observatorio .. .. | — | — | 1910 | — | 1910 | 1910 | — | — |
| *h.* **CENTRAL AND SOUTH AMERICA AND WEST INDIES.** | | | | | | | | |
| *hb.* **Central America, &c.:—** | | | | | | | | |
| Belize, Colonial Surgeon .. .. | — | — | — | — | 1910 | — | — | — |
| Costa Rica, *U.S. Weather Bureau, Washington.* | — | — | — | 1908 | — | — | — | — |
| San Salvador, Observatorio Meteorologico y Astronomico. | — | — | — | — | — | 1902 | — | — |
| Tegucigalpa, Laboratorio Central | — | — | — | — | 1905 | — | — | — |
| *hc.* **West Indian Islands, Caribbean Sea, Gulf of Mexico:—** | | | | | | | | |
| Antigua, Government Laboratory. | — | 1908 | — | — | 1910 | 1908 | — | — |
| Bahamas (Colonial Reports) .. | — | — | — | — | 1902 | 1905 | — | — |
| Barbados, St. Lucia, Jamaica, Bermuda. *Army Medical Dep., London.* | — | — | — | — | — | 1906 | — | — |
| Dominica, Botanic Station .. | — | 1907 | — | — | — | — | — | — |
| Grenada, Carriacou Observatory | — | — | — | — | 1909 | — | — | — |
| Grenada, Richmond Hill Observatory. | — | 1908 | — | — | 1910 | — | — | — |
| Guadeloupe, Haiti, Martinique. *Bureau Central Mét., Paris.* | — | — | — | — | 1907 | 1907 | — | — |
| Havana, Observatorio del Colegio de Belen. | — | — | — | — | 1909 | — | — | — |
| Havana, Secretaria de Agricultura, &c. | 1910 | — | 1910 | — | 1910 | 1910 | — | — |
| Jamaica, Government Laboratory, Kingston. | — | 1910 | 1910 | — | — | 1910 | — | 1910 |
| Port-au-Prince, (Haiti.) *K. K. Central-Anstalt für Meteorologie, Vienna.* | — | — | 1907 | — | 1907 | 1907 | — | — |
| St. Lucia, Agricultural Superintendent. | — | 1910 | — | — | — | — | — | — |
| St. Lucia Botanic Gardens .. | — | 1909 | — | — | — | 1909 | — | — |
| St. Lucia, Harbour Master .. | — | — | — | — | 1910 | — | — | — |
| St. Vincent, Botanic Gardens .. | — | 1907 | 1903 | — | — | — | — | — |
| *U.S. Weather Bureau Washington.* | — | — | — | — | — | 1908 | — | — |

## GEOGRAPHICAL LIST—*continued.*

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|---|---|---|---|---|---|---|---|---|
| *h.* **CENTRAL AND SOUTH AMERICA AND WEST INDIES**—*cont.* | | | | | | | | |
| *hd.* **Guiana—British, Dutch, and French ; Venezuela ; Trinidad :—** | | | | | | | | |
| Cayenne. *Bureau Central Mét., Paris.* | — | — | — | — | 1907 | 1907 | — | — |
| Georgetown, Demerara, Botanic Gardens. | — | — | — | — | 1910 | 1910 | — | — |
| Paramaribo. *K. Nederlandsch Meteorologisch Instituut, de Bilt.* | — | — | — | — | 1904 | — | — | — |
| Trinidad, Royal Botanic Gardens | — | 1908 | 1907 | — | — | 1908 | — | — |
| *hf.* **Peru :—** | | | | | | | | |
| *Astronomical Observatory of Harvard College, Cambridge (Mass.).* | — | — | — | 1895 | 1895 | — | — | — |
| Piura. *Deutsche Seewarte, Hamburg.* | — | — | — | — | — | 1906 | — | — |
| *hg.* **Bolivia :—** | | | | | | | | |
| Madidi. *Bureau Central Mét., Paris.* | — | — | — | — | — | 1903 | — | — |
| *hh.* **Brazil :—** | | | | | | | | |
| Ministerio de Marinha, Directoria de Meteorologia, Rio Janeiro. | — | — | 1904 | 1904 | 1906 | — | — | — |
| Cuyabá, Observatorio Meteorologico "D. Bosco." | — | — | — | — | 1909 | — | — | — |
| Para Prata. *K.K. Central-Anstalt für Meteorologie, Vienna.* | — | — | — | — | 1906 | — | — | — |
| Rio Janeiro, Observatorio .. | — | — | 1908 | — | 1908 | 1908 | — | — |
| São Paulo, Secretaria da Agricultura, &c. | — | — | — | — | — | 1905 | — | — |
| Descalvados. *Deutsche Seewarte, Hamburg.* | — | — | — | 1906 | — | 1906 | — | — |
| *hi.* **Argentina, Uruguay, and Paraguay :—** | | | | | | | | |
| Oficina Meteorológica Argentina (Buenos Aires). | — | — | — | — | — | — | 1910 | — |
| Dirección General del Servicio Meteorológico Nacional, Monte Video. | — | 1905 | — | — | — | 1905 | — | — |
| Direccion General de Estadistica del Uruguay, Monte Video. | 1906 | — | — | — | — | 1906 | — | — |
| Fray Bentos. *Deutsche Seewarte, Hamburg.* | — | — | — | — | — | 1893 | — | — |
| Monte Video, Observatorio National Fisico-Climatologico. | — | — | — | 1908 | 1908 | — | — | 1908 |
| Villa Colón, Observatorio Meteorológico. | — | — | — | 1902 | 1902 | 1906 | — | 1902 |

## GEOGRAPHICAL LIST—*continued.*

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|---|---|---|---|---|---|---|---|---|
| *h.* **CENTRAL AND SOUTH AMERICA AND WEST INDIES**—*cont.* | | | | | | | | |
| *hk.* **Chili**:— | | | | | | | | |
| Servicio Meteorolójico de la Direccion del Territorio Maritimo (Valparaiso.) | — | — | 1908 | — | 1908 | 1908 | — | — |
| Punta Arenas, Observatorio Meteorológico del Colegio Salesiano "S. José." | — | 1902 | 1907 | 1907 | 1910 | 1907 | — | — |
| Santiago, Observatorio Astronómico. | — | — | 1909 | — | — | 1909 | — | — |
| *hl.* **Falkland Islands**:— | | | | | | | | |
| Stanley .. .. .. .. | — | — | — | — | — | 1909 | — | — |
| *i.* **AUSTRALASIA.** | | | | | | | | |
| Sydney Observatory .. .. | — | — | — | — | — | — | 1909 | — |
| *ia.* **New Guinea**:— | | | | | | | | |
| Papua (Government Gazette) .. | — | — | — | — | — | 1909 | — | — |
| *ib.* **Bismarck Archipelago**:— | | | | | | | | |
| Rakuranga. *Deutsche Seewarte, Hamburg.* | — | — | — | — | — | 1908 | — | — |
| *ic.* **Australia**:— | | | | | | | | |
| Central Weather Bureau, Melbourne. | — | 1908 | — | — | — | — | 1910 | — |
| *id.* **Queensland**:— | | | | | | | | |
| Brisbane, Government Statistician's Office. | 1905 | — | — | — | — | 1905 | — | — |
| Brisbane, Weather Bureau .. | — | — | — | — | — | 1907 | — | — |
| *ie.* **New South Wales**:— | | | | | | | | |
| Sydney, Department of Public Instruction. | — | 1902 | — | — | 1902 | 1902 | — | — |
| Windsor (John Tebbutt) .. .. | — | — | — | — | — | 1903 | — | — |
| *ig.* **South Australia**:— | | | | | | | | |
| Adelaide Observatory .. .. | — | 1905 | 1905 | — | 1905 | 1905 | — | — |
| *ih.* **West Australia**:— | | | | | | | | |
| Perth, Observatory .. .. .. | — | 1908 | 1907 | — | 1907 | 1907 | — | 1906 |
| Perth, Government Statistician's Office. | — | 1908 | 1908 | — | — | 1908 | — | — |
| *ik.* **New Zealand**:— | | | | | | | | |
| Wellington, Meteorological Office | — | 1908 | 1908 | — | 1908 | 1908 | 1905 | — |
| Wellington, Government Observatory. | — | — | — | — | 1904 | — | — | — |

## GEOGRAPHICAL LIST—*continued.*

| NAME OF INSTITUTION, &c. | Climatology—Agricultural and Hygienic. 1710 & 1730. | Rainfall Tables. 1180. | Meteorological Observations —General. 1800. | Hourly Values. 1810. | Daily Values. 1820. | Monthly and Yearly Mean Values. 1825. | Daily Weather Reports and Charts. 1830. | Weekly or Monthly Weather Reports. 1840. |
|---|---|---|---|---|---|---|---|---|
| *i.* **AUSTRALASIA**—*cont.* | | | | | | | | |
| *il.* **New Caledonia, New Hebrides, and Loyalty Islands:—** | | | | | | | | |
| Noumea, Paita (N. Cal.), Port Vila (New Hebrides). *Bureau Central Mét., Paris.* | — | 1907 | — | — | — | 1907 | — | — |
| *k.* **ARCTIC.** | | | | | | | | |
| *ka.* **Arctic Ocean:—** | | | | | | | | |
| Ziegler Polar Expedition, 1903-5 | — | — | — | — | 1905 | — | — | — |
| Netherlands Polar Expedition .. | — | — | 1882-3 | 1882-3 | — | — | — | — |
| *kb.* **Greenland:—** | | | | | | | | |
| *Dansk Meteorologisk Institut (Copenhagen).* | — | — | — | — | 1907 | 1907 | — | — |
| *kd.* **Islands north of Europe and Asia:—** | | | | | | | | |
| Norwegian North Polar Expedition [H. Mohn]. | — | — | 1896 | 1896 | 1896 | — | — | — |
| Spitzbergen (J. Westman) .. | — | — | — | 1900 | — | — | — | — |
| *l.* **ATLANTIC.** | | | | | | | | |
| *lb.* **Azores, Canaries, Madeira, Cape Verde:—** | | | | | | | | |
| Service Météorologique des Açores, Ponta Delgada. | — | — | 1908 | 1908 | — | 1908 | — | — |
| Las Palmas. *Instituto Central Meteorológico, Madrid.* | — | — | — | — | — | 1908 | — | — |
| Teneriffe, Las Palmas. *Observatorio Do Infante D. Luiz, Lisbon.* | — | — | — | — | — | 1905 | — | — |
| Teneriffe, Las Palmas. *Bureau Central Mét., Paris.* | — | — | — | — | — | 1907 | — | — |
| Teneriffe (La Paz Botanica), *Deutsche Seewarte, Hamburg.* | — | — | — | — | — | 1908 | — | — |
| *m.* **INDIAN OCEAN.** | | | | | | | | |
| *ma.* **Ocean and Islands north of Equator:—** | | | | | | | | |
| Amini Divi, Minicoy. *Meteorological Office, India (Simla).* | — | — | — | — | — | 1909 | — | — |
| *mb.* **Ocean and Islands south of Equator:—** | | | | | | | | |
| Christmas Island. *Scottish Met. Soc., Edinburgh.* | — | — | — | — | — | 1907 | — | — |
| Christmas Island. Straits Settlements Gazette. | — | — | — | — | 1909 | — | — | — |
| Cocos, Keeling Islands, *Observatory, Perth, W.A.* | — | — | — | — | — | 1907 | — | — |
| Mauritius, Royal Alfred Observatory. | — | — | 1909 | 1905 | 1906 | — | — | — |
| Mauritius. *Army Medical Dep., London.* | — | — | — | — | — | 1903 | — | — |
| Mauritius, Seychelles, Diego Garcia. *Meteorological Office, India (Simla).* | — | — | — | — | — | 1909 | — | — |
| Réunion. *Bureau Central Mét., Paris.* | — | 1907 | — | — | — | 1907 | — | — |

## Geographical List—*continued.*

| Name of Institution, &c. | Climatology—Agricultural and Hygienic. 1710 & 1730. | Rainfall Tables. 1180. | Meteorological Observations —General. 1800. | Hourly Values. 1810. | Daily Values. 1820. | Monthly and Yearly Mean Values. 1825. | Daily Weather Reports and Charts. 1830. | Weekly or Monthly Weather Reports. 1840. |
|---|---|---|---|---|---|---|---|---|
| *n.* **PACIFIC.** | | | | | | | | |
| *nd, ne.* **Pacific Islands North of Equator:—** | | | | | | | | |
| Honolulu (R. C. Lydecker) .. | — | — | — | — | 1903 | — | — | — |
| Honolulu. *U.S. Weather Bureau, Washington.* | — | — | — | — | 1908 | — | — | — |
| Caroline, Gilbert and Marshall Islands. *Deutsche Seewarte, Hamburg.* | — | — | — | — | — | 1908 | — | — |
| *nf, nh.* **Pacific Islands South of Equator:—** | | | | | | | | |
| Samoa Observatorium .. .. | — | — | 1906 | 1906 | — | 1906 | — | — |
| Samoa and Cook Islands. *Deutsche Seewarte, Hamburg.* | — | — | — | — | 1906 | 1908 | — | — |
| Suva, Department of Agriculture | — | — | — | — | — | 1909 | — | — |
| Suva, Fiji (J. D. W. Vaughan) .. | — | — | — | — | 1905 | — | — | — |
| Tahiti, Rikitea (Mangareva). *Bureau Central Mét., Paris.* | — | — | — | — | 1904 | 1907 | — | — |
| *o.* **ANTARCTIC.** | | | | | | | | |
| *ob.* **S. Georgia, and Islands S. of S. Atlantic:—** | | | | | | | | |
| Schwedische Südpolar Expedition (Snow Hill). | — | — | 1903 | 1903 | — | — | — | — |
| Petermann Island (J. Rouch) .. | — | — | — | — | — | 1909 | — | — |
| *oc.* **Islands South of Indian Ocean:—** | | | | | | | | |
| Deutsche Südpolar Expedition, Winterstation des "Gauss." | — | — | 1903 | 1903 | 1903 | — | — | — |
| *od.* **Islands to Southward and South-East of New Zealand:—** | | | | | | | | |
| National Antarctic Expedition, 1901–1904. | — | — | 1904 | 1904 | 1904 | — | — | — |

## LIST OF CURRENT METEOROLOGICAL PERIODICALS AND JOURNALS CONTAINING OCCASIONAL ARTICLES ON METEOROLOGICAL SUBJECTS RECEIVED FOR THE OFFICE LIBRARY.

Annales de l'Observatoire Municipal, Paris.
Annales du Bureau Central Météorologique de France.
†Annalen der Hydrographie und maritimen Meteorologie.
Annali dell' Ufficio Centrale Meteorologico e Geodinamico Italiano
Annuaire de la Société Météorologique de France.
†Annuaire Météorologique de l'Observatoire Royal de Belgique
Astro. Physical Journal.
Aus dem Archiv der Deutschen Seewarte.
Australian Monthly Weather Report.
†Beiträge zur Physik der freien Atmosphäre.

Boletín mensual del Observatorio meteorológico central de Mexico.
Bollettino bimensuale della Societa Meteorologica Italiana.
Botanical Journal.
†Bulletin of the Mount Weather Observatory.
Bulletin of the Philippine Weather Bureau.
†Bulletin de l'Institut Aerodynamique de Koutchino.
Cairo Scientific Journal.
†Ciel et Terre.
Comptes rendus hebdomadaires des séances de l'Académie des Sciences, Paris.
†Das Wetter.
Geographical Journal.
Globe (Le), Journal Géographique.
Indian Meteorological Memoirs.
Jahrbuch der Astronomie und Geophysik (H. J. Klein).
Journal of the Franklin Institute.
Journal of the Meteorological Society of Japan.
Journal of the Royal United Service Institution.
Journal of the Scottish Meteorological Society.
Journal of the Royal Society of Arts.
London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science.
Memoirs and Proceedings of the Manchester Literary and Philosophical Society.
Memorias de Sociedad Cientifica " Antonio Alzate," Mexico.
Meteorologische Zeitschrift.
Mitteilungen aus dem Gebiete des Seewesens, Pola.
Monthly Meteorological Bulletin of the Nicolas Central Physical Observatory.
Monthly Notices of the Royal Astronomical Society.
Monthly Weather Review of the U.S. Weather Bureau.
Nature.
Nature (La).
Nautical Magazine.
Oversigt over det Kongelige danske Videnskabernes Selskab Forhandlinger.
Petermann's (Dr. A.) Mitteilungen aus Justus Perthes' Geographischer Anstalt.
Proceedings of the American Philosophical Society.
Proceedings of the Cambridge Philosophical Society.
Proceedings of the Royal Institution.
Proceedings of the Royal Irish Academy.
Proceedings of the Royal Society of Edinburgh.
Proceedings of the Royal Society of London.
Quarterly Journal of the Royal Meteorological Society.
Scientific Proceedings of the Royal Dublin Society.
Scottish Geographical Magazine.
Smithsonian Contributions to Knowledge.
Smithsonian Miscellaneous Collections.
†Symons's Meteorological Magazine.
Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap.

In addition to the works summarised in the above lists, a large number of books and pamphlets dealing with meteorological subjects have been received. Some of the more important are referred to on p. 39 of the Report.

The compilation of a complete bibliography of meteorological literature is included in the objects of the International Catalogue of Scientific Literature, and the necessity for the publication in full of the titles of all books and pamphlets received at the office is thereby obviated. It is intended to deal with the matter in due course in connexion with the catalogue of the Library.

# APPENDIX VIII.

## LIST of INSTITUTIONS receiving PUBLICATIONS issued by the COMMITTEE.

OBSERVERS contributing returns printed in one of the periodical publications receive a copy of the publication. The Committee request that the copies may be returned to the Office after the observer has no personal use for them, in cases where they are not filed in a public library or other institution where the public can consult them.

The *Daily Weather Report* is sent to seaports and to a few places in London for exhibition.

The *Annual Report* is sent to all observers at land stations in connexion with the Office who express a wish to receive it.

Periodical or occasional publications are sent to the institutions named in the following list, generally speaking, in exchange for publications received.

UNITED KINGDOM.

| | |
|---|---|
| Public Offices: | |
| Aberdeen ... | B.T., Supt. M.M.O. |
| Avonmouth | B.T., Supt. M.M.O. |
| Barrow-in-Furness. | Sueter, Capt. R.N. |
| Barry ... | B.T. Surveyor. |
| Belfast ... | B.T., Supt. M.M.O. |
| Blyth ... | B.T., Supt. M.M.O. |
| Bristol ... | B.T., Supt. M.M.O. |
| Cardiff ... | B.T., Supt. M.M.O. |
| Dartmouth | Admiralty, Royal Naval College.<br>B.T., Supt. M.M.O. |
| Dublin ... | Board of Agriculture and Technical Instruction.<br>General Register Office.<br>Ordnance Survey Office. |
| Dundee ... | B.T., Supt. M.M.O. |
| Edinburgh... | Board of Fisheries.<br>General Register Office.<br>Royal Observatory.<br>*†Royal Scottish Museum. |
| Farnborough | School of Ballooning.<br>Balloon Factory. |
| Glasgow ... | B.T., Supt. M.M.O. |
| Gloucester | B.T., Supt. M.M.O. |
| Greenock ... | B.T., Supt. M.M.O. |
| Grimsby ... | B.T., Supt. M.M.O. |
| Hartlepool | B.T., Supt. M.M.O. |
| Hull ... | B.T., Supt. M.M.O. |
| Leith ... | B.T., Supt. M.M.O. |
| Liverpool .. | B.T., Supt. M.M.O. |
| London ... | Admiralty, Hydrographer.<br>—— Librarian.<br>*†—— Royal Naval College.<br>—— Royal Observatory.<br>Army Medical Department. |
| UNITED KINGDOM—*cont.* | |
| Public Offices —*cont.* | |
| London .. | Board of Agriculture.<br>—— (Fisheries Division).<br>*†Board of Education, Science Library.<br>—— Solar Physics Observatory.<br>Board of Trade, Consultative Branch.<br>—— Fisheries and Harbour Department.<br>—— Marine Department.<br>—— Standard Weights and Measures Department.<br>—— Supt. M.M.O. Dock Street.<br>—— Supt. M.M.O. Poplar.<br>—— Supt. M.M.O. Tilbury.<br>—— Supt. M.M.O. Victoria Docks.<br>—— Surveyor.<br>British Museum, Dept. of Printed Books.<br>Chinese Maritime Customs.<br>General Post Office.<br>General Register Office.<br>*Imperial Institute.<br>Local Government Board.<br>National Physical Laboratory (Bushy House).<br>—— (Kew Obs.).<br>—— (Eskdalemuir).<br>Trinity House. |

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* Receive all publications, including the Daily Weather Report in those cases which are also marked †.

## LIST OF INSTITUTIONS receiving PUBLICATIONS—*cont.*

| UNITED KINGDOM—*cont.* | |
|---|---|
| Public Offices—*cont.* | |
| Manchester | B.T., Supt. M.M.O. |
| Middlesborough. | B.T., Supt. M.M.O. |
| Newcastle-on-Tyne. | B.T., Supt. M.M.O. |
| Newport ... | B.T., Supt. M.M.O. |
| Plymouth ... | B.T., Supt. M.M.O. |
| Shields North. | B.T., Supt. M.M.O. |
| Shields South. | B.T., Supt. M.M.O. |
| Southampton. | B.T. Supt. M.M.O.<br>Ordnance Survey Office. |
| Sunderland | B.T., Supt. M.M.O. |
| Swansea ... | B.T., Supt. M.M.O. |
| Institutions: | |
| Aberdeen ... | Observatory. |
| Aberystwyth | The University. |
| Alnwick ... | Duke of Northumberland's Observatory. |
| Armagh ... | Observatory. |
| Aspatria ... | Royal Agricultural College. |
| Belfast ... | Queen's College.<br>University. |
| BexleyHeath | Editor,Findlay's Sailing Directions. |
| Bidston ... | Liverpool Observatory. |
| Birkenhead | "Conway" Training Ship. |
| Birmingham | Central Free Library.<br>Midland Institute.<br>University, Librarian. |
| Birr Castle... | Observatory. |
| Cambridge... | Cavendish Laboratory.<br>Observatory.<br>Philosophical Society. |
| Cardiff ... | University College. |
| Cirencester... | Royal Agricultural College. |
| Dublin ... | Royal Dublin Society.<br>Royal Irish Academy.<br>Trinity College. |
| Dundee ... | Chalmers, Capt.(Agent).<br>International Commission for Investigation of North Sea.<br>University College. |
| Durham ... | Observatory. |
| Edinburgh... | Royal Scottish Geographical Society.<br>Royal Society.<br>*†Scottish Meteorological Society.<br>University Library. |
| Falmouth ... | Observatory.<br>Royal Cornwall Polytechnic Society. |
| Glasgow ... | "Nautical Magazine."<br>Observatory. |

| UNITED KINGDOM—*cont.* | |
|---|---|
| Institutions—*cont.* | |
| Greenhithe | "Worcester" Training Ship. |
| Hull ... | Shipmasters' Association. |
| Jersey ... | St. Louis Observatory. |
| Kingstown... | Municipal Library. |
| Leeds ... | University. |
| Leith ... | Nautical College. |
| Liverpool ... | Free Public Library.<br>Mercantile Marine Service Association.<br>Nautical College.<br>Richardson, Spence & Co.<br>Sargeant, Capt. (Agent.)<br>Underwriters' Rooms.<br>University, Physical Laboratory. |
| London ... | Aeronautical Society.<br>British Association.<br>Eastern Telegraph Co.<br>*Guildhall Library.<br>Institution of Civil Engineers.<br>Institution of Mining Engineers.<br>*†Lloyd's.<br>London Institution.<br>Metropolitan Water Board.<br>*British Rainfall Organisation.<br>"Nature."<br>Navigation School.<br>Royal Astronomical Society.<br>Royal Botanic Society.<br>Royal College of Science.<br>Royal Geographical Society.<br>Royal Institution of Great Britain.<br>*†Royal Meteorological Society.<br>Royal National Lifeboat Institution.<br>Royal Society.<br>Royal Society of Arts.<br>Royal Society of Medicine.<br>*Royal United Service Institution.<br>School of Economics.<br>"Shipping Gazette."<br>University College. |
| Manchester | Philosophical Society.<br>University, Meteorological Department. |
| Markree ... | Observatory. |
| Newcastle-on-Tyne. | Armstrong College. |

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* Receive all publications, including the Daily Weather Report in those cases which are also marked †

## LIST OF INSTITUTIONS receiving PUBLICATIONS—*cont.*

### UNITED KINGDOM—*cont.*

| | |
|---|---|
| Institutions—*cont.* | |
| Northampton | Natural History Society. |
| Oxford | Bodleian Library. |
| | Clifton, Prof. R. B. |
| | Radcliffe Observatory. |
| | School of Geography. |
| Plymouth | Incorporated Chamber of Commerce. |
| | Marine Biological Laboratory. |
| Southampton | Forbes, Capt. (Agent). |
| Southport | Fernley Observatory. |
| South Shields. | Marine Schools. |
| Stamford | Free Library. |
| Stonyhurst | Observatory. |
| Torquay | Natural History Society. |
| Valencia | Observatory. |
| York | Philosophical Society. |

### BRITISH COLONIES AND DEPENDENCIES.

*Australasia.*

| | |
|---|---|
| Adelaide | Commonwealth Bureau of Meteorology. |
| | Public Library. |
| Brisbane | Commonwealth Bureau of Meteorology. |
| | Public Library. |
| Hobart | Commonwealth Bureau of Meteorology. |
| Melbourne | *†Commonwealth Bureau of Meteorology. |
| | Commonwealth Statistical Bureau. |
| | Department of Agriculture. |
| | Observatory. |
| | Public Library. |
| Perth | Commonwealth Bureau of Meteorology. |
| Sydney | Commonwealth Bureau of Meteorology. |
| | Public Library. |
| | Royal Society of New South Wales. |
| Wellington | Colonial Museum. |
| Windsor | Observatory. |

*Canada.*

| | |
|---|---|
| Montreal | McGill University. |
| Toronto | *†Meteorological Office. |
| Victoria (B.C.) | Meteorological Office. |

*India and Eastern Asia.*

| | |
|---|---|
| Allahabad | Meteorological Reporter. |
| Bangalore | Meteorological Department. |
| Bombay | Observatory. |
| Calcutta | Director General of Observatories. |
| | Surveyor General. |

### BRITISH COLONIES AND DEPENDENCIES—*cont.*

*India and Eastern Asia*—cont.

| | |
|---|---|
| Dehra Dun | Trigonometrical Survey. |
| Hong Kong | Observatory. |
| Kodaikanal | Observatory. |
| Simla | Director General of Observatories. |
| Singapore | Principal Civil Medical Officer. |

*Mediterranean.*

| | |
|---|---|
| Malta | Observatory. |

*South Africa.*

| | |
|---|---|
| Bloemfontein | Grey College. |
| Cape Town | Observatory. |
| | Meteorological Commission. |
| Durban | Natal Observatory. |
| Johannesburg | Transvaal Meteorological Department. |

*Indian Ocean.*

| | |
|---|---|
| Mauritius | Meteorological Society. |

*West India Islands.*

| | |
|---|---|
| Jamaica | Government Meteorologist. |

### EUROPE.

*Austria-Hungary.*

| | |
|---|---|
| Agram | Landes Anstalt. |
| Brünn | Natural History Society. |
| Buda-Pesth | Central Meteorological Institute. |
| Cracow | Observatory. |
| Fiume | Nautical Academy. |
| Innsbruck | Observatory. |
| O'Gyalla | Observatory. |
| Pola | Hydrographic Office. |
| Prague | Hydrographic Office. |
| | Observatory. |
| | Royal Society of Sciences. |
| Trieste | Observatory. |
| Vienna | Austrian Meteorological Society. |
| | Central Hydrographical Bureau. |
| | *†Central Meteorological Office. |
| | *Hann, Hofrath Dr. J. |

*Belgium.*

| | |
|---|---|
| Brussels | *†Observatory (Uccle) |
| Ostend | Navigation School. |

*Bulgaria.*

| | |
|---|---|
| Sofia | Central Meteorological Station. |

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* Receive all publications, including the Daily Weather Report in those cases which are also marked †.

## LIST OF INSTITUTIONS receiving PUBLICATIONS—*cont.*

### EUROPE—*cont.*

*Denmark.*

| | |
|---|---|
| Copenhagen | Hydrographic Office.<br>International Council for the Study of the Sea.<br>Meteorological Institute.<br>Society of Sciences. |

*France.*

| | |
|---|---|
| Bordeaux | Society of Oceanography of the Gulf of Gascony. |
| Lyons | Observatory. |
| Marseilles | Meteorological Commission. |
| Paris | *†Central Meteorological Office.<br>Hydrographic Office.<br>Hydrometric Service.<br>Institute of France.<br>Meteorological Society.<br>Municipal Observatory |
| Perpignan | Meteorological Commission. |
| Puy-de-Dôme | Observatory. |

*Germany.*

| | |
|---|---|
| Aachen | Meteorological Station. |
| Berlin | Hydrographic Office.<br>*†Meteorological Institute. |
| Bremen | Meteorological Observatory. |
| Carlsruhe | Central Meteorological Office. |
| Darmstadt | Hydrographical Bureau. |
| Dresden | Meteorological Institute. |
| Frankfort | Physical Society.<br>Weather Service. |
| Gotha | M. Justus Perthes' Geographical Institute. |
| Greifswald | Geographical Society. |
| Halle | Leopold - Carolin Academy. |
| Hamburg | *†Deutsche Seewarte.<br>Schück, Capt. A. |
| Kiel | Commission for the Exploration of the German Ocean. |
| Leipzig | University Library. |
| Lindenberg | Royal Prussian Aeronautical Observatory. |
| Magdeburg | Observatory. |

### EUROPE—*cont.*

*Germany*—cont.

| | |
|---|---|
| Munich | Central Meteorological Office.<br>Observatory. |
| Neustadt | Forest Academy. |
| Potsdam | Observatory. |
| Strassburg | Meteorological Agricultural Service. |
| Stuttgart | Central Meteorological Office. |
| Wilhelmshaven | Observatory. |

*Greece.*

| | |
|---|---|
| Athens | Observatory. |

*Italy.*

| | |
|---|---|
| Catania | Meteorological Observatory. |
| Florence | Observatory. |
| Milan | Observatory. |
| Moncalieri | Observatory. |
| Naples | Observatory. |
| Palermo | Observatory. |
| Pesaro | Observatory. |
| Riposto | Observatory. |
| Rome | Central Meteorological Office.<br>International Agricultural Institute. |
| Turin | Observatory. |
| Venice | Hydrographical Office.<br>Observatory. |

*Netherlands.*

| | |
|---|---|
| Amsterdam | Geographical Society.<br>Meteorological Institute. |
| Helder | Institute for the Study of the Sea. |
| Utrecht, (De Bilt). | *†Royal Meteorological Institute. |

*Norway.*

| | |
|---|---|
| Christiania | Meteorological Institute. |

*Portugal.*

| | |
|---|---|
| Coimbra | Observatory. |
| Lisbon | Observatory. |

*Azores.*

| | |
|---|---|
| Ponta Delgada | Observatory. |

*Roumania.*

| | |
|---|---|
| Bucharest | Meteorological Institute. |

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* Receive all publications, including the Daily Weather Report in those cases which are also marked †.

# LIST OF INSTITUTIONS receiving PUBLICATIONS—*cont.*

## EUROPE—*cont.*

### *Russia.*

| | |
|---|---|
| Ekaterinburg | Observatory. |
| Helsingfors | Society of Sciences. |
| Jurjev | Observatory. |
| Kazan | Observatory. |
| Kieff | Observatory. |
| Koutchino | Aerodynamical Institute. |
| Moscow | Observatory. |
| Nicolaieff | Hydrographic Office. |
| Odessa | Observatory. |
| Pavlovsk | Observatory. |
| St. Petersburg | *†Nicolas Central Physical Observatory. |
| | Hydrographic Department. |
| | Imperial Institute of Forestry. |
| Tiflis | Observatory. |
| Warsaw | Meteorological Bureau. |

### *Servia.*

| | |
|---|---|
| Belgrade | Central Observatory. |

### *Spain.*

| | |
|---|---|
| Granada | Cartuja Observatory. |
| Guardia | Observatory. |
| Madrid | Central Meteorological Institute. |
| | Observatory. |
| | Observatory, Chamartin de la Rosa. |
| Malaga | Society of Sciences. |
| San Fernando | Observatory. |
| Tortosa | Ebro Observatory. |
| Vilafranca del Panades. | Observatory. |

### *Sweden.*

| | |
|---|---|
| Stockholm | Central Meteorological Institute. |
| | Hydrographic Office. |
| | Nautical Meteorological Bureau. |
| | Royal Academy. |
| Upsala | Meteorological Observatory. |

### *Switzerland.*

| | |
|---|---|
| Berne | National Hydrography. |
| Geneva | Geographical Society. |
| Mont Blanc | Observatory. |
| Neuchâtel | Observatory. |
| Zürich | Central Meteorological Office. |

## AFRICA.

| | |
|---|---|
| Algiers | Meteorological Service. |
| Cairo | Sanitary Department. |
| | *† Survey Department. |

## AMERICA.

### *United States.*

| | |
|---|---|
| Baltimore | Maryland Weather Service. |
| Cambridge, Mass. | Harvard College Observatory. |
| New York | American Geographical Society. |
| | Central Park Observatory. |
| | State Hydrographer. |
| | State Library. |
| Philadelphia | American Philosophical Society. |
| | Franklin Institute. |
| Reno | Mount Rose Observatory. |
| Washington | Chief Signal Officer. |
| | Department of Agriculture. |
| | Department of Terrestrial Magnetism. |
| | Editor, Terrestrial Magnetism. |
| | Hydrographer's Office. |
| | Mount Weather Observatory. |
| | Naval Observatory. |
| | Smithsonian Institution. |
| | Coast and Geodetic Survey. |
| | Surgeon General's Office. |
| | *†Weather Bureau. |

### *Mexico.*

| | |
|---|---|
| Guanajuato | Observatory. |
| Mexico | "Antonio Alzate" Scientific Society. |
| | Central Meteorological Observatory. |
| Oaxaca | Observatory. |
| Puebla | Boletin de Estadistica. |
| Saltillo | Observatory. |
| San Luis Potosi. | Observatory. |
| San Salvador | Observatory. |

### *Central America, West Indies.*

| | |
|---|---|
| Costa Rica | Meteorological Institute. |
| Guatemala | Central Laboratory. |
| Havana | Observatory. |
| | Central Meteorological Station. |
| Porto Rico | Engineer in Chief. |

### *Argentina.*

| | |
|---|---|
| Buenos Aires | Meteorological Office. |
| | Mons. Lasagna Observatory. |
| Cordoba | National Academy. |

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* Receive all publications, including the Daily Weather Report in those cases which are also marked †.

## LIST OF INSTITUTIONS receiving PUBLICATIONS—*cont.*

AMERICA—*cont.*

*Brazil.*

| | |
|---|---|
| Porto Alegre ... | Azambuja, Sr. G. A. de |
| Rio de Janeiro | Meteorological Department.<br>Observatory. |
| São Paulo ... | Secretary of Agriculture, &c. |

*Chile.*

| | |
|---|---|
| Valparaiso ... | Meteorological Service. |

*Ecuador.*

| | |
|---|---|
| Quito... ... | Observatory. |

AMERICA—*cont.*

*Uruguay.*

| | |
|---|---|
| Monte Video ... | National Physical Institution.<br>Observatory, Villa Colon. |

ASIA.

| | |
|---|---|
| Batavia ... | Observatory. |
| Beyrout ... | Lee Observatory. |
| Chemulpo ... | Observatory. |
| Irkutsk ... | Observatory. |
| Manila ... | Meteorological Observatory. |
| Tokio ... ... | Imperial Meteorological Observatory. |
| Zi-ka-wei ... | *Observatory. |

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